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# SuperHyperDomination

Ideas | Approaches | Accessibility | Availability

**Dr. Henry Garrett**

Report | Exposition | References | Research #22 2023







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In this scientific research book, there are some scientific research chapters on "Extreme SuperHyper", "Neutrosophic SuperHyper", and "Neutrosophic SuperHyper" by two (Extreme/Neutrosophic) notions, namely, Extreme SuperHyper and Neutrosophic SuperHyper. With scientific researches on the basic properties, the scientific research book starts to make Extreme SuperHyper theory and Neutrosophic SuperHyper theory more (Extremely/Neutrosophically) understandable.

Some scientific studies and scientific researches about neutrosophic graphs, are proposed as book in the following by Henry Garrett (2022) which is indexed by Google Scholar and has more than 3230 readers in Scribd. It's titled "Beyond Neutrosophic Graphs" and published by Ohio: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United States. This research book covers different types of notions and settings in neutrosophic graph theory and neutrosophic SuperHyperGraph theory.

[Ref] Henry Garrett, (2022). "Beyond Neutrosophic Graphs", Ohio: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United States. ISBN: 978-1-59973-725-6 (http://s.unm.edu/BeyondNeutrosophicGraphs.pdf).

Also, some scientific studies and scientific researches about neutrosophic graphs, are proposed as book in the following by Henry Garrett (2022) which is indexed by Google Scholar and has more than 4117 readers in Scribd. It's titled "Neutrosophic Duality" and published by Florida: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. This research book presents different types of notions SuperHyperResolving and SuperHyperDominating in the setting of duality in neutrosophic graph theory and neutrosophic SuperHyperGraph theory. This research book has scrutiny on the complement of the intended set and the intended set, simultaneously, it's smart to consider a set but acting on its complement that what's done in this research book which is popular in the terms of high readers in Scribd.

[Ref] Henry Garrett, (2022). "Neutrosophic Duality", Florida: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. ISBN: 978-1-59973-743-0 (http://s.unm.edu/NeutrosophicDuality.pdf).



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# Contents

---

Contents	iii
List of Figures	vi
List of Tables	xi
1 ABSTRACT	1
2 BACKGROUND	11
Bibliography	15
3 Acknowledgements	25
4 Extreme SuperHyperDominating	27
5 New Ideas On Super Missing By Hyper Searching Of SuperHyperDominating In Cancer's Recognition With (Neutrosophic) SuperHyperGraph	29
6 ABSTRACT	31
7 Background	37
8 Applied Notions Under The Scrutiny Of The Motivation Of This Scientific Research	41
9 Extreme Preliminaries Of This Scientific Research On the Redeemed Ways	45
10 Extreme SuperHyperDominating But As The Extensions Excerpt From Dense And Super Forms	55
11 The Extreme Departures on The Theoretical Results Toward Theoretical Motivations	75
	iii

12	The Surveys of Mathematical Sets On The Results But As The Initial Motivation	85
13	Extreme Applications in Cancer's Extreme Recognition	97
14	Case 1: The Initial Extreme Steps Toward Extreme SuperHyperBipartite as Extreme SuperHyperModel	99
15	Case 2: The Increasing Extreme Steps Toward Extreme SuperHyperMultipartite as Extreme SuperHyperModel	101
16	Wondering Open Problems But As The Directions To Forming The Motivations	103
17	Conclusion and Closing Remarks	105
18	ExtremeSuperHyperDuality But As The Extensions Excerpt From Dense And Super Forms	107
19	ExtremeSuperHyperJoin But As The Extensions Excerpt From Dense And Super Forms	121
20	ExtremeSuperHyperPerfect But As The Extensions Excerpt From Dense And Super Forms	135
21	ExtremeSuperHyperTotal But As The Extensions Excerpt From Dense And Super Forms	149
22	ExtremeSuperHyperConnected But As The Extensions Excerpt From Dense And Super Forms	163
	Bibliography	177
23	Neutrosophic SuperHyperDominating	181
24	New Ideas In Cancer's Recognition And Neutrosophic SuperHyperGraph By SuperHyperDominating As Hyper Closing On Super Messy	183
25	ABSTRACT	185
26	Background	191
27	Applied Notions Under The Scrutiny Of The Motivation Of This Scientific Research	195
28	Neutrosophic Preliminaries Of This Scientific Research On the Redeemed Ways	199

29	Neutrosophic SuperHyperDominating But As The Extensions Excerpt From Dense And Super Forms	209
30	The Neutrosophic Departures on The Theoretical Results Toward Theoretical Motivations	229
31	The Surveys of Mathematical Sets On The Results But As The Initial Motivation	239
32	Neutrosophic Applications in Cancer’s Neutrosophic Recognition	251
33	Case 1: The Initial Neutrosophic Steps Toward Neutrosophic SuperHyperBipartite as Neutrosophic SuperHyperModel	253
34	Case 2: The Increasing Neutrosophic Steps Toward Neutrosophic SuperHyperMultipartite as Neutrosophic SuperHyperModel	255
35	Wondering Open Problems But As The Directions To Forming The Motivations	257
36	Conclusion and Closing Remarks	259
37	Neutrosophic SuperHyperDuality But As The Extensions Excerpt From Dense And Super Forms	261
38	Neutrosophic SuperHyperJoin But As The Extensions Excerpt From Dense And Super Forms	275
39	Neutrosophic SuperHyperPerfect But As The Extensions Excerpt From Dense And Super Forms	289
40	Neutrosophic SuperHyperTotal But As The Extensions Excerpt From Dense And Super Forms	303
41	Neutrosophic SuperHyperConnected But As The Extensions Excerpt From Dense And Super Forms	317
	Bibliography	331
42	Books’ Contributions	335
43	“SuperHyperGraph-Based Books”:   Featured Tweets	341
44	CV	369

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## List of Figures

---

2.1	“#108th Book”    SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs . . . . .	21
2.2	“#108th Book”    SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs . . . . .	22
2.3	“#108th Book”    SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs . . . . .	22
10.1	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	56
10.2	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	57
10.3	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	57
10.4	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	58
10.5	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	59
10.6	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	60
10.7	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	60
10.8	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	61
10.9	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	62
10.10	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	63
10.11	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	63

10.12	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	64
10.13	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	65
10.14	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	66
10.15	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	67
10.16	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	67
10.17	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	68
10.18	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	69
10.19	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	70
10.20	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	71
10.21	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	72
10.22	The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3) . . . . .	73
11.1	a Extreme SuperHyperPath Associated to the Notions of Extreme SuperHyperDominating in the Example (41.0.5) . . . . .	76
11.2	a Extreme SuperHyperCycle Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.7) . . . . .	78
11.3	a Extreme SuperHyperStar Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.9) . . . . .	79
11.4	Extreme SuperHyperBipartite Extreme Associated to the Extreme Notions of Extreme SuperHyperDominating in the Example (41.0.11) . . . . .	81
11.5	a Extreme SuperHyperMultipartite Associated to the Notions of Extreme SuperHyperDominating in the Example (41.0.13) . . . . .	82
11.6	a Extreme SuperHyperWheel Extreme Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.15) . . . . .	83
14.1	a Extreme SuperHyperBipartite Associated to the Notions of Extreme SuperHyperDominating . . . . .	99
15.1	a Extreme SuperHyperMultipartite Associated to the Notions of Extreme SuperHyperDominating . . . . .	101
29.1	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	210
29.2	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	211

29.3	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	211
29.4	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	212
29.5	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	213
29.6	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	214
29.7	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	214
29.8	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	215
29.9	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	216
29.10	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	217
29.11	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	217
29.12	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	218
29.13	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	219
29.14	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	220
29.15	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	221
29.16	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	221
29.17	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	222
29.18	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	223
29.19	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	224
29.20	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	225
29.21	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	226
29.22	The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3) . . . . .	227
30.1	a Neutrosophic SuperHyperPath Associated to the Notions of Neutrosophic SuperHyperDominating in the Example (41.0.5) . . . . .	230
30.2	a Neutrosophic SuperHyperCycle Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.7) . . . . .	232

30.3 a Neutrosophic SuperHyperStar Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.9) . . . . .	233
30.4 Neutrosophic SuperHyperBipartite Neutrosophic Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Example (41.0.11) . . . . .	235
30.5 a Neutrosophic SuperHyperMultipartite Associated to the Notions of Neutrosophic SuperHyperDominating in the Example (41.0.13) . . . . .	236
30.6 a Neutrosophic SuperHyperWheel Neutrosophic Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.15) . . . . .	237
33.1 a Neutrosophic SuperHyperBipartite Associated to the Notions of Neutrosophic SuperHyperDominating . . . . .	253
34.1 a Neutrosophic SuperHyperMultipartite Associated to the Notions of Neutrosophic SuperHyperDominating . . . . .	255
42.1 “#108th Book”    SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs . . . . .	337
42.2 “#108th Book”    SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs . . . . .	338
42.3 “#108th Book”    SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs . . . . .	338
43.1 “SuperHyperGraph-Based Books”:   Featured Tweets . . . . .	342
43.2 “SuperHyperGraph-Based Books”:   Featured Tweets . . . . .	343
43.3 “SuperHyperGraph-Based Books”:   Featured Tweets #69 . . . . .	344
43.4 “SuperHyperGraph-Based Books”:   Featured Tweets #69 . . . . .	345
43.5 “SuperHyperGraph-Based Books”:   Featured Tweets #69 . . . . .	346
43.6 “SuperHyperGraph-Based Books”:   Featured Tweets #68 . . . . .	347
43.7 “SuperHyperGraph-Based Books”:   Featured Tweets #68 . . . . .	348
43.8 “SuperHyperGraph-Based Books”:   Featured Tweets #68 . . . . .	349
43.9 “SuperHyperGraph-Based Books”:   Featured Tweets #68 . . . . .	350
43.10 “SuperHyperGraph-Based Books”:   Featured Tweets #67 . . . . .	350
43.11 “SuperHyperGraph-Based Books”:   Featured Tweets #67 . . . . .	351
43.12 “SuperHyperGraph-Based Books”:   Featured Tweets #67 . . . . .	352
43.13 “SuperHyperGraph-Based Books”:   Featured Tweets #67 . . . . .	353
43.14 “SuperHyperGraph-Based Books”:   Featured Tweets #66 . . . . .	353
43.15 “SuperHyperGraph-Based Books”:   Featured Tweets #66 . . . . .	354
43.16 “SuperHyperGraph-Based Books”:   Featured Tweets #66 . . . . .	355
43.17 “SuperHyperGraph-Based Books”:   Featured Tweets #66 . . . . .	356
43.18 “SuperHyperGraph-Based Books”:   Featured Tweets #66 . . . . .	356
43.19 “SuperHyperGraph-Based Books”:   Featured Tweets #65 . . . . .	357
43.20 “SuperHyperGraph-Based Books”:   Featured Tweets #65 . . . . .	358
43.21 “SuperHyperGraph-Based Books”:   Featured Tweets #65 . . . . .	359
43.22 “SuperHyperGraph-Based Books”:   Featured Tweets #65 . . . . .	360

43.23“SuperHyperGraph-Based Books”:	Featured Tweets #65 . . . . .	361
43.24“SuperHyperGraph-Based Books”:	Featured Tweets #65 . . . . .	362
43.25“SuperHyperGraph-Based Books”:	Featured Tweets #64 . . . . .	363
43.26“SuperHyperGraph-Based Books”:	Featured Tweets #63 . . . . .	364
43.27“SuperHyperGraph-Based Books”:	Featured Tweets #62 . . . . .	365
43.28“SuperHyperGraph-Based Books”:	Featured Tweets #61 . . . . .	366
43.29“SuperHyperGraph-Based Books”:	Featured Tweets #60 . . . . .	367

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## List of Tables

---

9.1	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)	54
9.2	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph, Mentioned in the Definition (28.0.22)	54
9.3	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)	54
14.1	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Extreme SuperHyperBipartite . . . . .	100
15.1	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Extreme SuperHyperMultipartite . . . . .	102
17.1	An Overlook On This Research And Beyond . . . . .	106
28.1	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)	208
28.2	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph, Mentioned in the Definition (28.0.22)	208
28.3	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)	208
33.1	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperBipartite . . . . .	254
34.1	The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperMultipartite . . . . .	256
36.1	An Overlook On This Research And Beyond . . . . .	260



# CHAPTER 1

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## ABSTRACT

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In this scientific research book, there are some scientific research chapters on “Extreme SuperHyperDomination” and “Neutrosophic SuperHyperDomination” about some scientific research on SuperHyperDomination by two (Extreme/Neutrosophic) notions, namely, Extreme SuperHyperDomination and Neutrosophic SuperHyperDomination. With scientific research on the basic scientific research properties, the scientific research book starts to make Extreme SuperHyperDomination theory and Neutrosophic SuperHyperDomination theory more (Extremely/Neutrosophicly) understandable.

In the some chapters, in some researches, new setting is introduced for new SuperHyperNotions, namely, a SuperHyperDomination and Neutrosophic SuperHyperDomination . Two different types of SuperHyperDefinitions are debut for them but the scientific research goes further and the SuperHyperNotion, SuperHyperUniform, and SuperHyperClass based on that are well-defined and well-reviewed. The literature review is implemented in the whole of this research. For shining the elegance and the significancy of this research, the comparison between this SuperHyperNotion with other SuperHyperNotions and fundamental SuperHyperNumbers are featured. The definitions are followed by the examples and the instances thus the clarifications are driven with different tools. The applications are figured out to make sense about the theoretical aspect of this ongoing research. The “Cancer’s Recognition” are the under scientific research to figure out the challenges make sense about ongoing and upcoming research. The special case is up. The cells are viewed in the deemed ways. There are different types of them. Some of them are individuals and some of them are well-modeled by the group of cells. These types are all officially called “SuperHyperVertex” but the relations amid them all officially called “SuperHyperEdge”. The frameworks “SuperHyperGraph” and “Neutrosophic SuperHyperGraph” are chosen and elected to scientific research about “Cancer’s Recognition”. Thus these complex and dense SuperHyperModels open up some avenues to scientific research on theoretical segments and “Cancer’s Recognition”. Some avenues are posed to pursue this research. It’s also officially collected in the form of some questions and some problems. Assume a SuperHyperGraph. Then  $\delta$ -SuperHyperDomination is a maximal of SuperHyperVertices with a maximum cardinality such that either of the following expressions hold for the (Neutrosophic) cardinalities of SuperHyperNeighbors of  $s \in S$  : there are  $|S \cap N(s)| > |S \cap (V \setminus N(s))| + \delta$ ; and  $|S \cap N(s)| < |S \cap (V \setminus N(s))| + \delta$ . The first Expression, holds if  $S$  is an  $\delta$ -SuperHyperOffensive. And the second Expression, holds if  $S$  is an  $\delta$ -SuperHyperDefensive; a Neutrosophic  $\delta$ -SuperHyperDomination is a maximal Neutrosophic of SuperHyperVertices with maximum Neutrosophic cardinality such that

either of the following expressions hold for the Neutrosophic cardinalities of SuperHyper-Neighbors of  $s \in S$  there are:  $|S \cap N(s)|_{Neutrosophic} > |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ ; and  $|S \cap N(s)|_{Neutrosophic} < |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ . The first Expression, holds if  $S$  is a Neutrosophic  $\delta$ -SuperHyperOffensive. And the second Expression, holds if  $S$  is a Neutrosophic  $\delta$ -SuperHyperDefensive It's useful to define a "Neutrosophic" version of a SuperHyperDomination . Since there's more ways to get type-results to make a SuperHyperDomination more understandable. For the sake of having Neutrosophic SuperHyperDomination, there's a need to "redefine" the notion of a "SuperHyperDomination ". The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, there's the usage of the position of labels to assign to the values. Assume a SuperHyperDomination . It's redefined a Neutrosophic SuperHyperDomination if the mentioned Table holds, concerning, "The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph" with the key points, "The Values of The Vertices & The Number of Position in Alphabet", "The Values of The SuperVertices&The maximum Values of Its Vertices", "The Values of The Edges&The maximum Values of Its Vertices", "The Values of The HyperEdges&The maximum Values of Its Vertices", "The Values of The SuperHyperEdges&The maximum Values of Its Endpoints". To get structural examples and instances, I'm going to introduce the next SuperHyperClass of SuperHyperGraph based on a SuperHyperDomination . It's the main. It'll be disciplinary to have the foundation of previous definition in the kind of SuperHyperClass. If there's a need to have all SuperHyperDomination until the SuperHyperDomination, then it's officially called a "SuperHyperDomination" but otherwise, it isn't a SuperHyperDomination . There are some instances about the clarifications for the main definition titled a "SuperHyperDomination ". These two examples get more scrutiny and discernment since there are characterized in the disciplinary ways of the SuperHyperClass based on a SuperHyperDomination . For the sake of having a Neutrosophic SuperHyperDomination, there's a need to "redefine" the notion of a "Neutrosophic SuperHyperDomination" and a "Neutrosophic SuperHyperDomination ". The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, there's the usage of the position of labels to assign to the values. Assume a Neutrosophic SuperHyperGraph. It's redefined "Neutrosophic SuperHyperGraph" if the intended Table holds. And a SuperHyperDomination are redefined to a "Neutrosophic SuperHyperDomination" if the intended Table holds. It's useful to define "Neutrosophic" version of SuperHyperClasses. Since there's more ways to get Neutrosophic type-results to make a Neutrosophic SuperHyperDomination more understandable. Assume a Neutrosophic SuperHyperGraph. There are some Neutrosophic SuperHyperClasses if the intended Table holds. Thus SuperHyperPath, SuperHyperDomination, SuperHyperStar, SuperHyperBipartite, SuperHyperMultiPartite, and SuperHyperWheel, are "Neutrosophic SuperHyperPath", "Neutrosophic SuperHyperDomination", "Neutrosophic SuperHyperStar", "Neutrosophic SuperHyperBipartite", "Neutrosophic SuperHyperMultiPartite", and "Neutrosophic SuperHyperWheel" if the intended Table holds. A SuperHyperGraph has a "Neutrosophic SuperHyperDomination" where it's the strongest [the maximum Neutrosophic value from all the SuperHyperDomination amid the maximum value amid all SuperHyperVertices from a SuperHyperDomination .] SuperHyperDomination . A graph is a SuperHyperUniform if it's a SuperHyperGraph and the number of elements of SuperHyperEdges are the same. Assume a Neutrosophic SuperHyperGraph. There are some SuperHyperClasses as follows. It's SuperHyperPath if it's only one SuperVertex as intersection amid two given SuperHyperEdges with two exceptions; it's SuperHyperDomination if it's only one SuperVertex as intersection amid two given SuperHyperEdges; it's SuperHyperStar

it's only one SuperVertex as intersection amid all SuperHyperEdges; it's SuperHyperBipartite it's 80  
only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, 81  
forming two separate sets, has no SuperHyperEdge in common; it's SuperHyperMultiPartite it's 82  
only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, 83  
forming multi separate sets, has no SuperHyperEdge in common; it's a SuperHyperWheel if it's 84  
only one SuperVertex as intersection amid two given SuperHyperEdges and one SuperVertex 85  
has one SuperHyperEdge with any common SuperVertex. The SuperHyperModel proposes 86  
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be based on the "Cancer's Recognition" and the results and the definitions will be introduced 94  
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region has been assigned by the model [it's called SuperHyperGraph] and the long cycle of 96  
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another model [it's said to be Neutrosophic SuperHyperGraph] to have convenient perception 100  
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any SuperHyperDomination but literarily, it's the deformation of any SuperHyperDomination. 112  
It, literarily, deforms and it doesn't form. A basic familiarity with SuperHyperGraph theory and 113  
Neutrosophic SuperHyperGraph theory are proposed. 114

**Keywords:** SuperHyperGraph, (Neutrosophic) SuperHyperDomination, Cancer's Recognition 115

**AMS Subject Classification:** 05C17, 05C22, 05E45 116

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is a maximal Neutrosophic SuperHyperDomination of SuperHyperVertices with maximum 142  
Neutrosophic cardinality such that either of the following expressions hold for the Neutrosophic 143  
cardinalities of SuperHyperNeighbors of  $s \in S$  :  $|S \cap N(s)|_{Neutrosophic} >$  144  
 $|S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ ,  $|S \cap N(s)|_{Neutrosophic} < |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ . 145  
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The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of 151  
the alphabets. In this procedure, there’s the usage of the position of labels to assign to the values. 152  
Assume a SuperHyperDomination . It’s redefined Neutrosophic SuperHyperDomination if the 153  
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## Beyond Neutrosophic Graphs

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and the strongest SuperHyperDomination, called Neutrosophic SuperHyperDomination, some general results are introduced. Beyond that in SuperHyperStar, all possible SuperHyperPaths have only two SuperHyperEdges but it's not enough since it's essential to have at least three SuperHyperEdges to form any style of a SuperHyperDomination. There isn't any formation of any SuperHyperDomination but literarily, it's the deformation of any SuperHyperDomination. It, literarily, deforms and it doesn't form. A basic familiarity with SuperHyperGraph theory and Neutrosophic SuperHyperGraph theory are proposed.

**Keywords:** Neutrosophic SuperHyperGraph, Neutrosophic SuperHyperDomination, Cancer's

Neutrosophic Recognition

**AMS Subject Classification:** 05C17, 05C22, 05E45

Some scientific studies and scientific researches about neutrosophic graphs, are proposed as book in the following by Henry Garrett (2022) which is indexed by Google Scholar and has more than 3181 readers in Scribd. It's titled "Beyond Neutrosophic Graphs" and published by Ohio: E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United State. This research book covers different types of notions and settings in neutrosophic graph theory and neutrosophic SuperHyperGraph theory.

[Ref] Henry Garrett, (2022). "*Beyond Neutrosophic Graphs*", Ohio: E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United States. ISBN: 978-1-59973-725-6 (<http://fs.unm.edu/BeyondNeutrosophicGraphs.pdf>).

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Also, some scientific studies and scientific researches about neutrosophic graphs, are proposed as book in the following by Henry Garrett (2022) which is indexed by Google Scholar and has more than 4060 readers in Scribd. It's titled "Neutrosophic Duality" and published by Florida: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. This research book presents different types of notions SuperHyperResolving and

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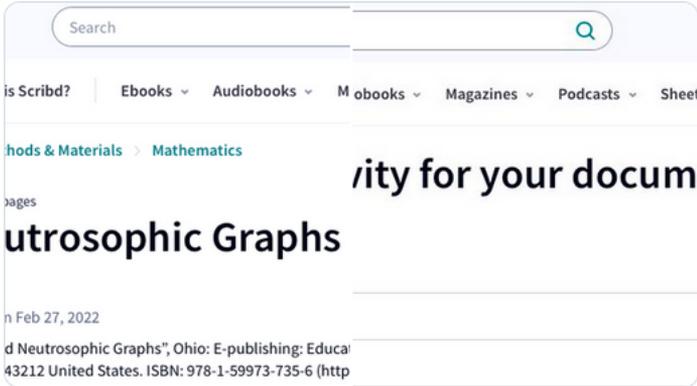
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# Neutrosophic Duality

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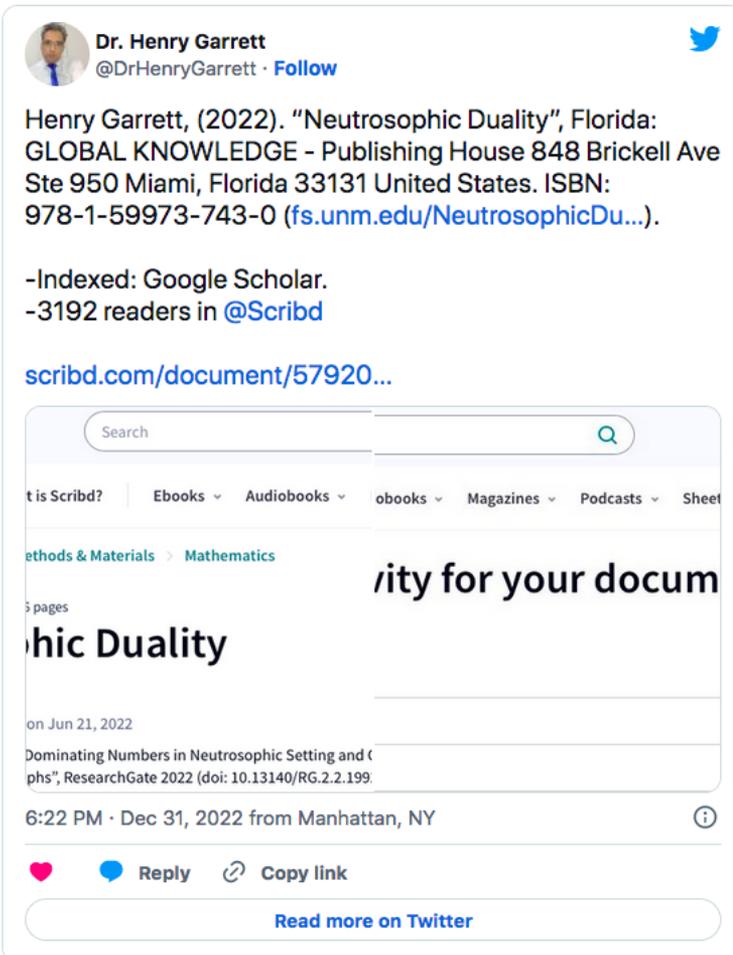
[Ref1] Henry Garrett, "Dual-Dominating Numbers in Neutrosophic Setting and Crisp Setting Obtained From Classes of Neutrosophic Graphs", ResearchGate 2022 (doi: 10.13140/RG.2.2.19925.91361). ... [Full description](#)



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## CHAPTER 2

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# BACKGROUND

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There are some scientific researches covering the topic of this research. In what follows, there are some discussion and literature reviews about them date back on January 22, 2023. 260 261

First article is titled “properties of SuperHyperGraph and neutrosophic SuperHyperGraph” in **Ref. [HG1]** by Henry Garrett (2022). It’s first step toward the research on neutrosophic SuperHyperGraphs. This research article is published on the journal “Neutrosophic Sets and Systems” in issue 49 and the pages 531-561. In this research article, different types of notions like dominating, resolving, coloring, Eulerian(Hamiltonian) neutrosophic path, n-Eulerian(Hamiltonian) neutrosophic path, zero forcing number, zero forcing neutrosophic- number, independent number, independent neutrosophic-number, clique number, clique neutrosophic-number, matching number, matching neutrosophic-number, girth, neutrosophic girth, 1-zero-forcing number, 1-zero- forcing neutrosophic-number, failed 1-zero-forcing number, failed 1-zero-forcing neutrosophic-number, global- offensive alliance, t-offensive alliance, t-defensive alliance, t-powerful alliance, and global-powerful alliance are defined in SuperHyperGraph and neutrosophic SuperHyperGraph. Some Classes of SuperHyperGraph and Neutrosophic SuperHyperGraph are cases of research. Some results are applied in family of SuperHyperGraph and neutrosophic SuperHyperGraph. Thus this research article has concentrated on the vast notions and introducing the majority of notions. 262 263 264 265 266 267 268 269 270 271 272 273 274 275

The seminal paper and groundbreaking article is titled “neutrosophic co-degree and neutrosophic degree alongside chromatic numbers in the setting of some classes related to neutrosophic hypergraphs” in **Ref. [HG2]** by Henry Garrett (2022). In this research article, a novel approach is implemented on SuperHyperGraph and neutrosophic SuperHyperGraph based on general forms without using neutrosophic classes of neutrosophic SuperHyperGraph. It’s published in prestigious and fancy journal is entitled “Journal of Current Trends in Computer Science Research (JCTCSR)” with abbreviation “J Curr Trends Comp Sci Res” in volume 1 and issue 1 with pages 06-14. The research article studies deeply with choosing neutrosophic hypergraphs instead of neutrosophic SuperHyperGraph. It’s the breakthrough toward independent results based on initial background. 276 277 278 279 280 281 282 283 284 285

The seminal paper and groundbreaking article is titled “Super Hyper Dominating and Super Hyper Resolving on Neutrosophic Super Hyper Graphs and Their Directions in Game Theory and Neutrosophic Super Hyper Classes” in **Ref. [HG3]** by Henry Garrett (2022). In this research article, a novel approach is implemented on SuperHyperGraph and neutrosophic SuperHyperGraph based on fundamental SuperHyperNumber and using neutrosophic SuperHyperClasses of neutrosophic SuperHyperGraph. It’s published in prestigious and fancy journal is entitled “Journal of Mathematical Techniques and Computational Mathematics(JMTCM)” with abbreviation “J 286 287 288 289 290 291 292

Math Techniques Comput Math” in volume 1 and issue 3 with pages 242-263. The research article 293  
studies deeply with choosing directly neutrosophic SuperHyperGraph and SuperHyperGraph. 294  
It’s the breakthrough toward independent results based on initial background and fundamental 295  
SuperHyperNumbers. 296

In some articles are titled “0039 | Closing Numbers and Super-Closing Numbers as (Dual)Resolving 297  
and (Dual)Coloring alongside (Dual)Dominating in (Neutrosophic)n-SuperHyperGraph” in **Ref.** 298  
[HG4] by Henry Garrett (2022), “0049 | (Failed)1-Zero-Forcing Number in Neutrosophic Graphs” 299  
in **Ref.** [HG5] by Henry Garrett (2022), “Extreme SuperHyperClique as the Firm Scheme 300  
of Confrontation under Cancer’s Recognition as the Model in The Setting of (Neutrosophic) 301  
SuperHyperGraphs” in **Ref.** [HG6] by Henry Garrett (2022), “Uncertainty On The Act And 302  
Effect Of Cancer Alongside The Foggy Positions Of Cells Toward Neutrosophic Failed SuperHy- 303  
perClique inside Neutrosophic SuperHyperGraphs Titled Cancer’s Recognition” in **Ref.** [HG7] 304  
by Henry Garrett (2022), “Neutrosophic Version Of Separates Groups Of Cells In Cancer’s 305  
Recognition On Neutrosophic SuperHyperGraphs” in **Ref.** [HG8] by Henry Garrett (2022), 306  
“The Shift Paradigm To Classify Separately The Cells and Affected Cells Toward The Totality 307  
Under Cancer’s Recognition By New Multiple Definitions On the Sets Polynomials Alongside 308  
Numbers In The (Neutrosophic) SuperHyperMatching Theory Based on SuperHyperGraph and 309  
Neutrosophic SuperHyperGraph” in **Ref.** [HG9] by Henry Garrett (2022), “Breaking the Con- 310  
tinuity and Uniformity of Cancer In The Worst Case of Full Connections With Extreme Failed 311  
SuperHyperClique In Cancer’s Recognition Applied in (Neutrosophic) SuperHyperGraphs” in 312  
**Ref.** [HG10] by Henry Garrett (2022), “Neutrosophic Failed SuperHyperStable as the Survivors 313  
on the Cancer’s Neutrosophic Recognition Based on Uncertainty to All Modes in Neutrosophic 314  
SuperHyperGraphs” in **Ref.** [HG11] by Henry Garrett (2022), “Extremism of the Attacked 315  
Body Under the Cancer’s Circumstances Where Cancer’s Recognition Titled (Neutrosophic) 316  
SuperHyperGraphs” in **Ref.** [HG12] by Henry Garrett (2022), “(Neutrosophic) 1-Failed Super- 317  
HyperForcing in Cancer’s Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref.** [HG13] 318  
by Henry Garrett (2022), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neutrosophic 319  
SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” in **Ref.** 320  
[HG14] by Henry Garrett (2022), “Neutrosophic 1-Failed SuperHyperForcing in the SuperHy- 321  
perFunction To Use Neutrosophic SuperHyperGraphs on Cancer’s Neutrosophic Recognition 322  
And Beyond” in **Ref.** [HG15] by Henry Garrett (2022), “(Neutrosophic) SuperHyperStable on 323  
Cancer’s Recognition by Well- SuperHyperModelled (Neutrosophic) SuperHyperGraphs ” in **Ref.** 324  
[HG16] by Henry Garrett (2022), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neut- 325  
rosophic SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” 326  
in **Ref.** [HG12] by Henry Garrett (2022), “Basic Notions on (Neutrosophic) SuperHyperFor- 327  
cing And (Neutrosophic) SuperHyperModeling in Cancer’s Recognitions And (Neutrosophic) 328  
SuperHyperGraphs” in **Ref.** [HG17] by Henry Garrett (2022), “Neutrosophic Messy-Style 329  
SuperHyperGraphs To Form Neutrosophic SuperHyperStable To Act on Cancer’s Neutrosophic 330  
Recognitions In Special ViewPoints” in **Ref.** [HG18] by Henry Garrett (2022),“(Neutrosophic) 331  
SuperHyperModeling of Cancer’s Recognitions Featuring (Neutrosophic) SuperHyperDefensive 332  
SuperHyperAlliances” in **Ref.** [HG19] by Henry Garrett (2022), “(Neutrosophic) SuperHy- 333  
perAlliances With SuperHyperDefensive and SuperHyperOffensive Type-SuperHyperSet On 334  
(Neutrosophic) SuperHyperGraph With (Neutrosophic) SuperHyperModeling of Cancer’s Re- 335  
cognitions And Related (Neutrosophic) SuperHyperClasses” in **Ref.** [HG20] by Henry Garrett 336  
(2022), “SuperHyperGirth on SuperHyperGraph and Neutrosophic SuperHyperGraph With Su- 337  
perHyperModeling of Cancer’s Recognitions” in **Ref.** [HG21] by Henry Garrett (2022), “Some 338

SuperHyperDegrees and Co-SuperHyperDegrees on Neutrosophic SuperHyperGraphs and Super-  
HyperGraphs Alongside Applications in Cancer’s Treatments” in **Ref. [HG22]** by Henry Garrett 339  
(2022), “SuperHyperDomination and SuperHyperResolving on Neutrosophic SuperHyperGraphs 340  
And Their Directions in Game Theory and Neutrosophic SuperHyperClasses” in **Ref. [HG23]** 341  
by Henry Garrett (2022), “SuperHyperMatching By (R-)Definitions And Polynomials To Monitor 342  
Cancer’s Recognition In Neutrosophic SuperHyperGraphs” in **Ref. [HG24]** by Henry Garrett 343  
(2023), “The Focus on The Partitions Obtained By Parallel Moves In The Cancer’s Extreme 344  
Recognition With Different Types of Extreme SuperHyperMatching Set and Polynomial on 345  
(Neutrosophic) SuperHyperGraphs” in **Ref. [HG25]** by Henry Garrett (2023), “Extreme Failed 346  
SuperHyperClique Decides the Failures on the Cancer’s Recognition in the Perfect Connections 347  
of Cancer’s Attacks By SuperHyperModels Named (Neutrosophic) SuperHyperGraphs” in **Ref.** 348  
**[HG26]** by Henry Garrett (2023), “Indeterminacy On The All Possible Connections of Cells In 349  
Front of Cancer’s Attacks In The Terms of Neutrosophic Failed SuperHyperClique on Cancer’s 350  
Recognition called Neutrosophic SuperHyperGraphs” in **Ref. [HG27]** by Henry Garrett (2023), 351  
“Perfect Directions Toward Idealism in Cancer’s Neutrosophic Recognition Forwarding Neutro- 352  
sophic SuperHyperClique on Neutrosophic SuperHyperGraphs” in **Ref. [HG28]** by Henry Garrett 353  
(2023), “Demonstrating Complete Connections in Every Embedded Regions and Sub-Regions in 354  
the Terms of Cancer’s Recognition and (Neutrosophic) SuperHyperGraphs With (Neutrosophic) 355  
SuperHyperClique” in **Ref. [HG29]** by Henry Garrett (2023), “Different Neutrosophic Types 356  
of Neutrosophic Regions titled neutrosophic Failed SuperHyperStable in Cancer’s Neutrosophic 357  
Recognition modeled in the Form of Neutrosophic SuperHyperGraphs” in **Ref. [HG30]** by 358  
Henry Garrett (2023), “Using the Tool As (Neutrosophic) Failed SuperHyperStable To Super- 359  
HyperModel Cancer’s Recognition Titled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG31]** 360  
by Henry Garrett (2023), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neutrosophic 361  
SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” in **Ref.** 362  
**[HG32]** by Henry Garrett (2023), “(Neutrosophic) SuperHyperStable on Cancer’s Recognition 363  
by Well-SuperHyperModelled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG33]** by Henry 364  
Garrett (2023), “Neutrosophic 1-Failed SuperHyperForcing in the SuperHyperFunction To Use 365  
Neutrosophic SuperHyperGraphs on Cancer’s Neutrosophic Recognition And Beyond” in **Ref.** 366  
**[HG34]** by Henry Garrett (2022), “(Neutrosophic) 1-Failed SuperHyperForcing in Cancer’s 367  
Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref. [HG35]** by Henry Garrett (2022), 368  
“Basic Notions on (Neutrosophic) SuperHyperForcing And (Neutrosophic) SuperHyperModeling 369  
in Cancer’s Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref. [HG36]** by Henry 370  
Garrett (2022), “Basic Neutrosophic Notions Concerning SuperHyperDomination and Neutro- 371  
sophic SuperHyperResolving in SuperHyperGraph” in **Ref. [HG37]** by Henry Garrett (2022), 372  
“Initial Material of Neutrosophic Preliminaries to Study Some Neutrosophic Notions Based on 373  
Neutrosophic SuperHyperEdge (NSHE) in Neutrosophic SuperHyperGraph (NSHG)” in **Ref.** 374  
**[HG38]** by Henry Garrett (2022), there are some endeavors to formalize the basic SuperHyper- 375  
Notions about neutrosophic SuperHyperGraph and SuperHyperGraph. 376  
Some scientific studies and scientific researches about neutrosophic graphs, are proposed as book 377  
in **Ref. [HG39]** by Henry Garrett (2022) which is indexed by Google Scholar and has more 378  
than 3181 readers in Scribd. It’s titled “Beyond Neutrosophic Graphs” and published by Ohio: 379  
E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United 380  
State. This research book covers different types of notions and settings in neutrosophic graph 381  
theory and neutrosophic SuperHyperGraph theory. 382  
Also, some scientific studies and scientific researches about neutrosophic graphs, are proposed 383  
384



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more than 4060 readers in Scribd. It's titled "Neutrosophic Duality" and published by Florida: 386  
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United States. This research book presents different types of notions SuperHyperResolving and 388  
SuperHyperDomination in the setting of duality in neutrosophic graph theory and neutrosophic 389  
SuperHyperGraph theory. This research book has scrutiny on the complement of the intended set 390  
and the intended set, simultaneously. It's smart to consider a set but acting on its complement 391  
that what's done in this research book which is popular in the terms of high readers in Scribd. 392  
See the seminal scientific researches [HG1; HG2; HG3]. The formalization of the notions on the 393  
framework of Extreme Failed SuperHyperClique theory, Neutrosophic Failed SuperHyperClique 394  
theory, and (Neutrosophic) SuperHyperGraphs theory at [HG4; HG5; HG6; HG7; HG8; 395  
HG9; HG10; HG11; HG12; HG13; HG14; HG15; HG16; HG17; HG18; HG19; HG20; 396  
HG21; HG22; HG23; HG24; HG25; HG26; HG27; HG28; HG29; HG30; HG31; HG32; 397  
HG33; HG34; HG35; HG36; HG37; HG38]. Two popular scientific research books in Scribd 398  
in the terms of high readers, 2638 and 3363 respectively, on neutrosophic science is on [HG39; 399  
HG40]. 400

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401

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Book #108	535
Title: SuperHyperDomination	536
#Latest_Updates	537
#The_Links	538
Available at WordPress Preprints_org ResearchGate Scribd academia ZENODO_ORG Twitter	539
LinkedIn Amazon googlebooks GooglePlay	540
-	541
	542
#Latest_Updates	543
	544
#The_Links	545
	546
Book #108	547
	548
Title: SuperHyperDomination	549
	550
Available at WordPress ResearchGate Scribd academia ZENODO_ORG Twitter LinkedIn	551
Amazon googlebooks GooglePlay	552
	553
-	554
	555
Publisher	556
(Paperback): <a href="https://www.amazon.com/dp/-">https://www.amazon.com/dp/-</a>	557
(Hardcover): <a href="https://www.amazon.com/dp/-">https://www.amazon.com/dp/-</a>	558
(Kindle Edition): <a href="https://www.amazon.com/dp/-">https://www.amazon.com/dp/-</a>	559
	560
-	561
	562
ISBN	563
(Paperback): -	564
(Hardcover): -	565
(Kindle Edition): CC BY-NC-ND 4.0	566
(EBook): CC BY-NC-ND 4.0	567
	568
-	569
	570
Print length	571
(Paperback): - pages	572
(Hardcover): - pages	573
(Kindle Edition): - pages	574
(E-Book): 418 pages	575
	576
-	577
	578
#Latest_Updates	579
	580

#The_Links	581
ResearchGate: <a href="https://www.researchgate.net/publication/-">https://www.researchgate.net/publication/-</a>	582
WordPress: <a href="https://drhenrygarrett.wordpress.com/2023/02/18/SuperHyperDomination/">https://drhenrygarrett.wordpress.com/2023/02/18/SuperHyperDomination/</a>	583
@Scribd: <a href="https://www.scribd.com/document/-">https://www.scribd.com/document/-</a>	584
academia: <a href="https://www.academia.edu/-">https://www.academia.edu/-</a>	585
ZENODO_ORG: <a href="https://zenodo.org/record/-">https://zenodo.org/record/-</a>	586
googlebooks: <a href="https://books.google.com/books/about?id=-">https://books.google.com/books/about?id=-</a>	587
GooglePlay: <a href="https://play.google.com/store/books/details?id=-">https://play.google.com/store/books/details?id=-</a>	588
	589
	590
	591
	592
	593
	594
	595
	596
	597

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SuperHyperDomination (Published Version)	598
The Link:	599
<a href="https://drhenrygarrett.wordpress.com/2023/02/18/SuperHyperDomination/">https://drhenrygarrett.wordpress.com/2023/02/18/SuperHyperDomination/</a>	600
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Posted by Dr. Henry Garrett	602
February 18, 2023	603
Posted in 0108   SuperHyperDomination	604
Tags:	605
Applications, Applied Mathematics, Applied Research, Cancer, Cancer’s Recognitions, Combinatorics, Edge, Edges, Graph Theory, Graphs, Latest Research, Literature Reviews, Modeling, Neutrosophic Graph, Neutrosophic Graph Theory, Neutrosophic Science, Neutrosophic SuperHyperClasses, Neutrosophic SuperHyperGraph, Neutrosophic SuperHyperGraph Theory, neutrosophic SuperHyperGraphs, Neutrosophic SuperHyperDomination, Open Problems, Open Questions, Problems, Pure Math, Pure Mathematics, Questions, Real-World Applications, Recent Research, Recognitions, Research, scientific research Article, scientific research Articles, scientific research Book, scientific research Chapter, scientific research Chapters, Review, SuperHyperClasses, SuperHyperEdges, SuperHyperGraph, SuperHyperGraph Theory, SuperHyperGraphs, SuperHyperDomination, SuperHyperModeling, SuperHyperVertices, Theoretical Research, Vertex, Vertices.	606
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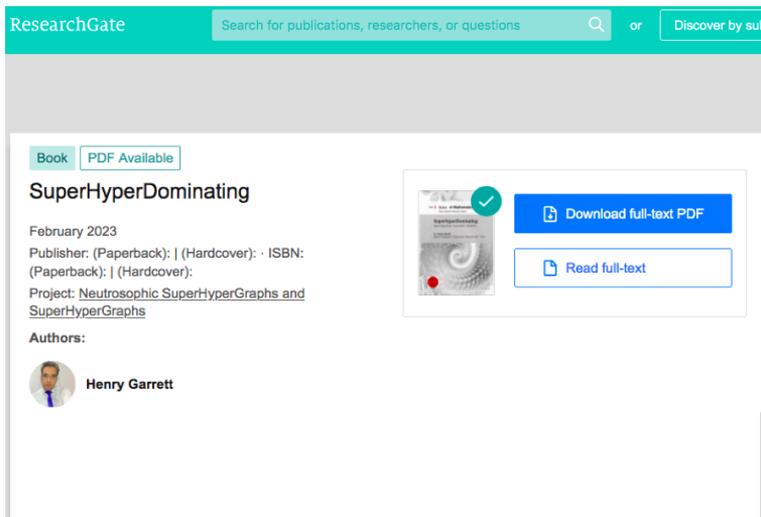


Figure 2.2: “#108th Book” || SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs

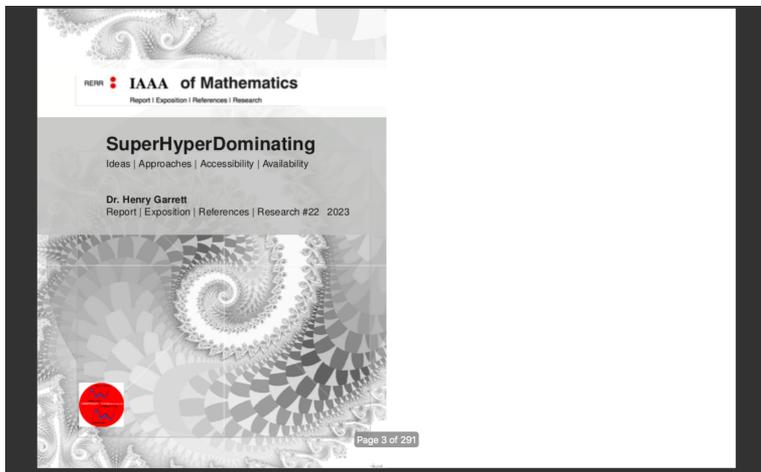


Figure 2.3: “#108th Book” || SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs

In this scientific research book, there are some scientific research chapters on “Extreme SuperHyperDomination” and “Neutrosophic SuperHyperDomination” about some researches on Extreme SuperHyperDomination and neutrosophic SuperHyperDomination.

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## CHAPTER 3

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# Acknowledgements

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The author is going to express his gratitude and his appreciation about the brains and their hands which are showing the importance of words in the framework of every wisdom, knowledge, arts, and emotions which are streaming in the lines from the words, notions, ideas and approaches to have the material and the contents which are only the way to flourish the minds, to grow the notions, to advance the ways and to make the stable ways to be amid events and storms of minds for surviving from them and making the outstanding experiences about the tools and the ideas to be on the star lines of words and shining like stars, forever.

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The words of mind and th

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eligible to be in the stage

of acknowledgements

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## Extreme SuperHyperDominating

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## CHAPTER 5

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### **New Ideas On Super Missing By Hyper Searching Of SuperHyperDominating In Cancer's Recognition With (Neutrosophic) SuperHyperGraph**

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## CHAPTER 6

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## ABSTRACT

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In this scientific research, (Different Neutrosophic Types of Neutrosophic SuperHyperDominating). 681  
Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 682  
Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  683  
or  $E'$  is called Neutrosophic e-SuperHyperDominating if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such 684  
that  $V_a \in E_i, E_j$ ; Neutrosophic re-SuperHyperDominating if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , 685  
such that  $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 686  
Neutrosophic v-SuperHyperDominating if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \in E_a$ ; 687  
and Neutrosophic rv-SuperHyperDominating if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 688  
 $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; Neutro- 689  
sophic SuperHyperDominating if it's either of Neutrosophic e-SuperHyperDominating, Neutro- 690  
sophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv- 691  
SuperHyperDominating. ((Neutrosophic) SuperHyperDominating). Assume a Neutrosophic Super- 692  
rHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperEdge 693  
(NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called an Extreme SuperHyperDominating if it's either of 694  
Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic 695  
v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an 696  
Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme 697  
SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperEdges in the consecutive 698  
Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they 699  
form the Extreme SuperHyperDominating; a Neutrosophic SuperHyperDominating if it's either of 700  
Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic 701  
v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a 702  
Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of 703  
the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic 704  
cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices 705  
such that they form the Neutrosophic SuperHyperDominating; an Extreme SuperHyperDom- 706  
inating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutro- 707  
sophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic 708  
rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  709  
is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Ex- 710  
treme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an 711  
Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges 712  
and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; 713

and the Extreme power is corresponded to its Extreme coefficient; a Neutrosophic SuperHyperDominating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient; an Extreme V-SuperHyperDominating if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; a Neutrosophic V-SuperHyperDominating if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; an Extreme V-SuperHyperDominating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; and the Extreme power is corresponded to its Extreme coefficient; a Neutrosophic SuperHyperDominating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient. In this scientific research, new setting is introduced for new SuperHyperNotions, namely, a SuperHyperDominating and Neutrosophic SuperHyperDominating. Two different types of SuperHyperDefinitions are debut for them but the research goes further and the SuperHyperNotion, SuperHyperUniform, and SuperHyperClass based on that are well-defined and well-reviewed. The literature review is implemented in the whole of this research. For shining the elegancy and the significance of this research, the comparison between this SuperHyperNotion with other SuperHyperNotions and fundamental SuperHyperNumbers are featured. The definitions are followed by the examples

and the instances thus the clarifications are driven with different tools. The applications are 760  
figured out to make sense about the theoretical aspect of this ongoing research. The “Cancer’s 761  
Recognition” are the under research to figure out the challenges make sense about ongoing and 762  
upcoming research. The special case is up. The cells are viewed in the deemed ways. There are 763  
different types of them. Some of them are individuals and some of them are well-modeled by 764  
the group of cells. These types are all officially called “SuperHyperVertex” but the relations 765  
amid them all officially called “SuperHyperEdge”. The frameworks “SuperHyperGraph” and 766  
“Neutrosophic SuperHyperGraph” are chosen and elected to research about “Cancer’s Recog- 767  
nition”. Thus these complex and dense SuperHyperModels open up some avenues to research 768  
on theoretical segments and “Cancer’s Recognition”. Some avenues are posed to pursue this 769  
research. It’s also officially collected in the form of some questions and some problems. As- 770  
sume a SuperHyperGraph. Assume a SuperHyperGraph. Then  $\delta$ -SuperHyperDominating is 771  
a maximal of SuperHyperVertices with a maximum cardinality such that either of the fol- 772  
lowing expressions hold for the (Neutrosophic) cardinalities of SuperHyperNeighbors of  $s \in S$  : 773  
there are  $|S \cap N(s)| > |S \cap (V \setminus N(s))| + \delta$ ; and  $|S \cap N(s)| < |S \cap (V \setminus N(s))| + \delta$ . The 774  
first Expression, holds if  $S$  is an  $\delta$ -SuperHyperOffensive. And the second Expression, holds 775  
if  $S$  is an  $\delta$ -SuperHyperDefensive; a Neutrosophic  $\delta$ -SuperHyperDominating is a maximal 776  
Neutrosophic of SuperHyperVertices with maximum Neutrosophic cardinality such that 777  
either of the following expressions hold for the Neutrosophic cardinalities of SuperHyper- 778  
Neighbors of  $s \in S$  there are:  $|S \cap N(s)|_{Neutrosophic} > |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ ; 779  
and  $|S \cap N(s)|_{Neutrosophic} < |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ . The first Expression, holds 780  
if  $S$  is a Neutrosophic  $\delta$ -SuperHyperOffensive. And the second Expression, holds if  $S$  is a 781  
Neutrosophic  $\delta$ -SuperHyperDefensive It’s useful to define a “Neutrosophic” version of a Super- 782  
HyperDominating . Since there’s more ways to get type-results to make a SuperHyperDominating 783  
more understandable. For the sake of having Neutrosophic SuperHyperDominating, there’s a 784  
need to “redefine” the notion of a “SuperHyperDominating ”. The SuperHyperVertices and the 785  
SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, 786  
there’s the usage of the position of labels to assign to the values. Assume a SuperHyperDominating 787  
. It’s redefined a Neutrosophic SuperHyperDominating if the mentioned Table holds, concerning, 788  
“The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to 789  
The Neutrosophic SuperHyperGraph” with the key points, “The Values of The Vertices & The 790  
Number of Position in Alphabet”, “The Values of The SuperVertices&The maximum Values of Its 791  
Vertices”, “The Values of The Edges&The maximum Values of Its Vertices”, “The Values of The 792  
HyperEdges&The maximum Values of Its Vertices”, “The Values of The SuperHyperEdges&The 793  
maximum Values of Its Endpoints”. To get structural examples and instances, I’m going to 794  
introduce the next SuperHyperClass of SuperHyperGraph based on a SuperHyperDominating 795  
. It’s the main. It’ll be disciplinary to have the foundation of previous definition in the kind 796  
of SuperHyperClass. If there’s a need to have all SuperHyperDominating until the SuperHy- 797  
perDominating, then it’s officially called a “SuperHyperDominating” but otherwise, it isn’t a 798  
SuperHyperDominating . There are some instances about the clarifications for the main definition 799  
titled a “SuperHyperDominating ”. These two examples get more scrutiny and discernment 800  
since there are characterized in the disciplinary ways of the SuperHyperClass based on a Supe- 801  
rHyperDominating . For the sake of having a Neutrosophic SuperHyperDominating, there’s a 802  
need to “redefine” the notion of a “Neutrosophic SuperHyperDominating” and a “Neutrosophic 803  
SuperHyperDominating ”. The SuperHyperVertices and the SuperHyperEdges are assigned by 804  
the labels from the letters of the alphabets. In this procedure, there’s the usage of the position 805

of labels to assign to the values. Assume a Neutrosophic SuperHyperGraph. It's redefined 806  
"Neutrosophic SuperHyperGraph" if the intended Table holds. And a SuperHyperDominating are 807  
redefined to a "Neutrosophic SuperHyperDominating" if the intended Table holds. It's useful to 808  
define "Neutrosophic" version of SuperHyperClasses. Since there's more ways to get Neutrosophic 809  
type-results to make a Neutrosophic SuperHyperDominating more understandable. Assume a 810  
Neutrosophic SuperHyperGraph. There are some Neutrosophic SuperHyperClasses if the intended 811  
Table holds. Thus SuperHyperPath, SuperHyperDominating, SuperHyperStar, SuperHyperBi- 812  
partite, SuperHyperMultiPartite, and SuperHyperWheel, are "Neutrosophic SuperHyperPath", 813  
"Neutrosophic SuperHyperDominating", "Neutrosophic SuperHyperStar", "Neutrosophic Super- 814  
HyperBipartite", "Neutrosophic SuperHyperMultiPartite", and "Neutrosophic SuperHyperWheel" 815  
if the intended Table holds. A SuperHyperGraph has a "Neutrosophic SuperHyperDominating" 816  
where it's the strongest [the maximum Neutrosophic value from all the SuperHyperDominating 817  
amid the maximum value amid all SuperHyperVertices from a SuperHyperDominating .] Super- 818  
HyperDominating . A graph is a SuperHyperUniform if it's a SuperHyperGraph and the number 819  
of elements of SuperHyperEdges are the same. Assume a Neutrosophic SuperHyperGraph. There 820  
are some SuperHyperClasses as follows. It's SuperHyperPath if it's only one SuperVertex as 821  
intersection amid two given SuperHyperEdges with two exceptions; it's SuperHyperDominating if 822  
it's only one SuperVertex as intersection amid two given SuperHyperEdges; it's SuperHyperStar 823  
it's only one SuperVertex as intersection amid all SuperHyperEdges; it's SuperHyperBipartite it's 824  
only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, 825  
forming two separate sets, has no SuperHyperEdge in common; it's SuperHyperMultiPartite it's 826  
only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, 827  
forming multi separate sets, has no SuperHyperEdge in common; it's a SuperHyperWheel if it's 828  
only one SuperVertex as intersection amid two given SuperHyperEdges and one SuperVertex 829  
has one SuperHyperEdge with any common SuperVertex. The SuperHyperModel proposes 830  
the specific designs and the specific architectures. The SuperHyperModel is officially called 831  
"SuperHyperGraph" and "Neutrosophic SuperHyperGraph". In this SuperHyperModel, The 832  
"specific" cells and "specific group" of cells are SuperHyperModeled as "SuperHyperVertices" 833  
and the common and intended properties between "specific" cells and "specific group" of cells 834  
are SuperHyperModeled as "SuperHyperEdges". Sometimes, it's useful to have some degrees of 835  
determinacy, indeterminacy, and neutrality to have more precise SuperHyperModel which in this 836  
case the SuperHyperModel is called "Neutrosophic". In the future research, the foundation will 837  
be based on the "Cancer's Recognition" and the results and the definitions will be introduced 838  
in redeemed ways. The recognition of the cancer in the long-term function. The specific region 839  
has been assigned by the model [it's called SuperHyperGraph] and the long cycle of the move 840  
from the cancer is identified by this research. Sometimes the move of the cancer hasn't be easily 841  
identified since there are some determinacy, indeterminacy and neutrality about the moves and 842  
the effects of the cancer on that region; this event leads us to choose another model [it's said 843  
to be Neutrosophic SuperHyperGraph] to have convenient perception on what's happened and 844  
what's done. There are some specific models, which are well-known and they've got the names, 845  
and some SuperHyperGeneral SuperHyperModels. The moves and the traces of the cancer on the 846  
complex tracks and between complicated groups of cells could be fantasized by a Neutrosophic 847  
SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyper- 848  
Multipartite, SuperHyperWheel). The aim is to find either the longest SuperHyperDominating 849  
or the strongest SuperHyperDominating in those Neutrosophic SuperHyperModels. For the 850  
longest SuperHyperDominating, called SuperHyperDominating, and the strongest SuperHyper- 851

Dominating, called Neutrosophic SuperHyperDominating, some general results are introduced. 852  
Beyond that in SuperHyperStar, all possible SuperHyperPaths have only two SuperHyperEdges 853  
but it's not enough since it's essential to have at least three SuperHyperEdges to form any style of 854  
a SuperHyperDominating. There isn't any formation of any SuperHyperDominating but literarily, 855  
it's the deformation of any SuperHyperDominating. It, literarily, deforms and it doesn't form. 856  
A basic familiarity with Neutrosophic SuperHyperDominating theory, SuperHyperGraphs, and 857  
Neutrosophic SuperHyperGraphs theory are proposed. 858

**Keywords:** Neutrosophic SuperHyperGraph, SuperHyperDominating, Cancer's Neutrosophic 859

Recognition 860

**AMS Subject Classification:** 05C17, 05C22, 05E45 861



## CHAPTER 7

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# Background

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There are some scientific researches covering the topic of this research. In what follows, there are some discussion and literature reviews about them date back on January 22, 2023. 864  
First article is titled “properties of SuperHyperGraph and neutrosophic SuperHyperGraph” in 865  
**Ref. [HG1]** by Henry Garrett (2022). It’s first step toward the research on neutrosophic Super- 866  
HyperGraphs. This research article is published on the journal “Neutrosophic Sets and Systems” 867  
in issue 49 and the pages 531-561. In this research article, different types of notions like domin- 868  
ating, resolving, coloring, Eulerian(Hamiltonian) neutrosophic path, n-Eulerian(Hamiltonian) 870  
neutrosophic path, zero forcing number, zero forcing neutrosophic- number, independent number, 871  
independent neutrosophic-number, clique number, clique neutrosophic-number, matching number, 872  
matching neutrosophic-number, girth, neutrosophic girth, 1-zero-forcing number, 1-zero- forcing 873  
neutrosophic-number, failed 1-zero-forcing number, failed 1-zero-forcing neutrosophic-number, 874  
global- offensive alliance, t-offensive alliance, t-defensive alliance, t-powerful alliance, and global- 875  
powerful alliance are defined in SuperHyperGraph and neutrosophic SuperHyperGraph. Some 876  
Classes of SuperHyperGraph and Neutrosophic SuperHyperGraph are cases of research. Some 877  
results are applied in family of SuperHyperGraph and neutrosophic SuperHyperGraph. Thus this 878  
research article has concentrated on the vast notions and introducing the majority of notions. 879  
The seminal paper and groundbreaking article is titled “neutrosophic co-degree and neutrosophic 880  
degree alongside chromatic numbers in the setting of some classes related to neutrosophic 881  
hypergraphs” in **Ref. [HG2]** by Henry Garrett (2022). In this research article, a novel approach 882  
is implemented on SuperHyperGraph and neutrosophic SuperHyperGraph based on general 883  
forms without using neutrosophic classes of neutrosophic SuperHyperGraph. It’s published 884  
in prestigious and fancy journal is entitled “Journal of Current Trends in Computer Science 885  
Research (JCTCSR)” with abbreviation “J Curr Trends Comp Sci Res” in volume 1 and issue 1 886  
with pages 06-14. The research article studies deeply with choosing neutrosophic hypergraphs 887  
instead of neutrosophic SuperHyperGraph. It’s the breakthrough toward independent results 888  
based on initial background. 889  
The seminal paper and groundbreaking article is titled “Super Hyper Dominating and Super 890  
Hyper Resolving on Neutrosophic Super Hyper Graphs and Their Directions in Game Theory 891  
and Neutrosophic Super Hyper Classes” in **Ref. [HG3]** by Henry Garrett (2022). In this 892  
research article, a novel approach is implemented on SuperHyperGraph and neutrosophic 893  
SuperHyperGraph based on fundamental SuperHyperNumber and using neutrosophic SuperHyper- 894  
Classes of neutrosophic SuperHyperGraph. It’s published in prestigious and fancy journal is 895  
entitled “Journal of Mathematical Techniques and Computational Mathematics(JMTCM)” with 896

abbreviation “J Math Techniques Comput Math” in volume 1 and issue 3 with pages 242-263. 897  
The research article studies deeply with choosing directly neutrosophic SuperHyperGraph and 898  
SuperHyperGraph. It’s the breakthrough toward independent results based on initial background 899  
and fundamental SuperHyperNumbers. 900

In some articles are titled “0039 | Closing Numbers and SupeV-Closing Numbers as 901  
(Dual)Resolving and (Dual)Coloring alongside (Dual)Dominating in (Neutrosophic)n- 902  
SuperHyperGraph” in **Ref. [HG4]** by Henry Garrett (2022), “0049 | (Failed)1-Zero-Forcing 903  
Number in Neutrosophic Graphs” in **Ref. [HG5]** by Henry Garrett (2022), “Extreme Super- 904  
HyperClique as the Firm Scheme of Confrontation under Cancer’s Recognition as the Model in 905  
The Setting of (Neutrosophic) SuperHyperGraphs” in **Ref. [HG6]** by Henry Garrett (2022), 906  
“Uncertainty On The Act And Effect Of Cancer Alongside The Foggy Positions Of Cells Toward 907  
Neutrosophic Failed SuperHyperClique inside Neutrosophic SuperHyperGraphs Titled Cancer’s 908  
Recognition” in **Ref. [HG7]** by Henry Garrett (2022), “Neutrosophic Version Of Separates 909  
Groups Of Cells In Cancer’s Recognition On Neutrosophic SuperHyperGraphs” in **Ref. [HG8]** 910  
by Henry Garrett (2022), “The Shift Paradigm To Classify Separately The Cells and Affected 911  
Cells Toward The Totality Under Cancer’s Recognition By New Multiple Definitions On the 912  
Sets Polynomials Alongside Numbers In The (Neutrosophic) SuperHyperMatching Theory 913  
Based on SuperHyperGraph and Neutrosophic SuperHyperGraph” in **Ref. [HG9]** by Henry 914  
Garrett (2022), “Breaking the Continuity and Uniformity of Cancer In The Worst Case of 915  
Full Connections With Extreme Failed SuperHyperClique In Cancer’s Recognition Applied in 916  
(Neutrosophic) SuperHyperGraphs” in **Ref. [HG10]** by Henry Garrett (2022), “Neutrosophic 917  
Failed SuperHyperStable as the Survivors on the Cancer’s Neutrosophic Recognition Based 918  
on Uncertainty to All Modes in Neutrosophic SuperHyperGraphs” in **Ref. [HG11]** by Henry 919  
Garrett (2022), “Extremism of the Attacked Body Under the Cancer’s Circumstances Where 920  
Cancer’s Recognition Titled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG12]** by Henry 921  
Garrett (2022), “(Neutrosophic) 1-Failed SuperHyperForcing in Cancer’s Recognitions And 922  
(Neutrosophic) SuperHyperGraphs” in **Ref. [HG13]** by Henry Garrett (2022), “Neutrosophic 923  
Messy-Style SuperHyperGraphs To Form Neutrosophic SuperHyperStable To Act on Cancer’s 924  
Neutrosophic Recognitions In Special ViewPoints” in **Ref. [HG14]** by Henry Garrett (2022), 925  
“Neutrosophic 1-Failed SuperHyperForcing in the SuperHyperFunction To Use Neutrosophic 926  
SuperHyperGraphs on Cancer’s Neutrosophic Recognition And Beyond” in **Ref. [HG15]** by 927  
Henry Garrett (2022), “(Neutrosophic) SuperHyperStable on Cancer’s Recognition by Well- 928  
SuperHyperModelled (Neutrosophic) SuperHyperGraphs ” in **Ref. [HG16]** by Henry Garrett 929  
(2022), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neutrosophic SuperHyperStable 930  
To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” in **Ref. [HG12]** by 931  
Henry Garrett (2022), “Basic Notions on (Neutrosophic) SuperHyperForcing And (Neutrosophic) 932  
SuperHyperModeling in Cancer’s Recognitions And (Neutrosophic) SuperHyperGraphs” in 933  
**Ref. [HG17]** by Henry Garrett (2022), “Neutrosophic Messy-Style SuperHyperGraphs To 934  
Form Neutrosophic SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special 935  
ViewPoints” in **Ref. [HG18]** by Henry Garrett (2022),“(Neutrosophic) SuperHyperModeling of 936  
Cancer’s Recognitions Featuring (Neutrosophic) SuperHyperDefensive SuperHyperAlliances” in 937  
**Ref. [HG19]** by Henry Garrett (2022), “(Neutrosophic) SuperHyperAlliances With SuperHyper- 938  
Defensive and SuperHyperOffensive Type-SuperHyperSet On (Neutrosophic) SuperHyperGraph 939  
With (Neutrosophic) SuperHyperModeling of Cancer’s Recognitions And Related (Neutro- 940  
sophic) SuperHyperClasses” in **Ref. [HG20]** by Henry Garrett (2022), “SuperHyperGirth on 941  
SuperHyperGraph and Neutrosophic SuperHyperGraph With SuperHyperModeling of Cancer’s 942

Recognitions” in **Ref. [HG21]** by Henry Garrett (2022), “Some SuperHyperDegrees and 943  
Co-SuperHyperDegrees on Neutrosophic SuperHyperGraphs and SuperHyperGraphs Alongside 944  
Applications in Cancer’s Treatments” in **Ref. [HG22]** by Henry Garrett (2022), “Super- 945  
HyperDominating and SuperHyperResolving on Neutrosophic SuperHyperGraphs And Their 946  
Directions in Game Theory and Neutrosophic SuperHyperClasses” in **Ref. [HG23]** by Henry 947  
Garrett (2022), “SuperHyperMatching By (V-)Definitions And Polynomials To Monitor Cancer’s 948  
Recognition In Neutrosophic SuperHyperGraphs” in **Ref. [HG24]** by Henry Garrett (2023), 949  
“The Focus on The Partitions Obtained By Parallel Moves In The Cancer’s Extreme Recognition 950  
With Different Types of Extreme SuperHyperMatching Set and Polynomial on (Neutrosophic) 951  
SuperHyperGraphs” in **Ref. [HG25]** by Henry Garrett (2023), “Extreme Failed SuperHyper- 952  
Clique Decides the Failures on the Cancer’s Recognition in the Perfect Connections of Cancer’s 953  
Attacks By SuperHyperModels Named (Neutrosophic) SuperHyperGraphs” in **Ref. [HG26]** by 954  
Henry Garrett (2023), “Indeterminacy On The All Possible Connections of Cells In Front of 955  
Cancer’s Attacks In The Terms of Neutrosophic Failed SuperHyperClique on Cancer’s Recognition 956  
called Neutrosophic SuperHyperGraphs” in **Ref. [HG27]** by Henry Garrett (2023), “Perfect 957  
Directions Toward Idealism in Cancer’s Neutrosophic Recognition Forwarding Neutrosophic 958  
SuperHyperClique on Neutrosophic SuperHyperGraphs” in **Ref. [HG28]** by Henry Garrett 959  
(2023), “Demonstrating Complete Connections in Every Embedded Regions and Sub-Regions in 960  
the Terms of Cancer’s Recognition and (Neutrosophic) SuperHyperGraphs With (Neutrosophic) 961  
SuperHyperClique” in **Ref. [HG29]** by Henry Garrett (2023), “Different Neutrosophic Types of 962  
Neutrosophic Regions titled neutrosophic Failed SuperHyperStable in Cancer’s Neutrosophic 963  
Recognition modeled in the Form of Neutrosophic SuperHyperGraphs” in **Ref. [HG30]** by 964  
Henry Garrett (2023), “Using the Tool As (Neutrosophic) Failed SuperHyperStable To SuperHyper- 965  
model Cancer’s Recognition Titled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG31]** by 966  
Henry Garrett (2023), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neutrosophic 967  
SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” in **Ref. 968  
[HG32]** by Henry Garrett (2023), “(Neutrosophic) SuperHyperStable on Cancer’s Recognition 969  
by Well-SuperHyperModelled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG33]** by Henry 970  
Garrett (2023), “Neutrosophic 1-Failed SuperHyperForcing in the SuperHyperFunction To Use 971  
Neutrosophic SuperHyperGraphs on Cancer’s Neutrosophic Recognition And Beyond” in **Ref. 972  
[HG34]** by Henry Garrett (2022), “(Neutrosophic) 1-Failed SuperHyperForcing in Cancer’s 973  
Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref. [HG35]** by Henry Garrett (2022), 974  
“Basic Notions on (Neutrosophic) SuperHyperForcing And (Neutrosophic) SuperHyperMod- 975  
eling in Cancer’s Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref. [HG36]** by 976  
Henry Garrett (2022), “Basic Neutrosophic Notions Concerning SuperHyperDominating and 977  
Neutrosophic SuperHyperResolving in SuperHyperGraph” in **Ref. [HG37]** by Henry Garrett 978  
(2022), “Initial Material of Neutrosophic Preliminaries to Study Some Neutrosophic Notions 979  
Based on Neutrosophic SuperHyperEdge (NSHE) in Neutrosophic SuperHyperGraph (NSHG)” 980  
in **Ref. [HG38]** by Henry Garrett (2022), there are some endeavors to formalize the basic 981  
SuperHyperNotions about neutrosophic SuperHyperGraph and SuperHyperGraph. 982  
Some scientific studies and scientific researches about neutrosophic graphs, are proposed as book 983  
in **Ref. [HG39]** by Henry Garrett (2022) which is indexed by Google Scholar and has more 984  
than 3230 readers in Scribd. It’s titled “Beyond Neutrosophic Graphs” and published by Ohio: 985  
E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United 986  
State. This research book covers different types of notions and settings in neutrosophic graph 987  
theory and neutrosophic SuperHyperGraph theory. 988

Also, some scientific studies and scientific researches about neutrosophic graphs, are proposed 989  
as book in **Ref. [HG40]** by Henry Garrett (2022) which is indexed by Google Scholar and has 990  
more than 4117 readers in Scribd. It's titled "Neutrosophic Duality" and published by Florida: 991  
GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 992  
United States. This research book presents different types of notions SuperHyperResolving and 993  
SuperHyperDominating in the setting of duality in neutrosophic graph theory and neutrosophic 994  
SuperHyperGraph theory. This research book has scrutiny on the complement of the intended set 995  
and the intended set, simultaneously. It's smart to consider a set but acting on its complement 996  
that what's done in this research book which is popular in the terms of high readers in Scribd. 997  
See the seminal scientific researches [**HG1; HG2; HG3**]. The formalization of the notions on 998  
the framework of Extreme SuperHyperDominating theory, Neutrosophic SuperHyperDominating 999  
theory, and (Neutrosophic) SuperHyperGraphs theory at [**HG4; HG5; HG6; HG7; HG8;** 1000  
**HG9; HG10; HG11; HG12; HG13; HG14; HG15; HG16; HG17; HG18; HG19; HG20;** 1001  
**HG21; HG22; HG23; HG24; HG25; HG26; HG27; HG28; HG29; HG30; HG31; HG32;** 1002  
**HG33; HG34; HG35; HG36; HG37; HG38**]. Two popular scientific research books in Scribd 1003  
in the terms of high readers, 3230 and 4117 respectively, on neutrosophic science is on [**HG39;** 1004  
**HG40**]. 1005

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## Applied Notions Under The Scrutiny Of The Motivation Of This Scientific Research

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In this scientific research, there are some ideas in the featured frameworks of motivations. I try to bring the motivations in the narrative ways. Some cells have been faced with some attacks from the situation which is caused by the cancer's attacks. In this case, there are some embedded analysis on the ongoing situations which in that, the cells could be labelled as some groups and some groups or individuals have excessive labels which all are raised from the behaviors to overcome the cancer's attacks. In the embedded situations, the individuals of cells and the groups of cells could be considered as "new groups". Thus it motivates us to find the proper SuperHyperModels for getting more proper analysis on this messy story. I've found the SuperHyperModels which are officially called "SuperHyperGraphs" and "Extreme SuperHyperGraphs". In this SuperHyperModel, the cells and the groups of cells are defined as "SuperHyperVertices" and the relations between the individuals of cells and the groups of cells are defined as "SuperHyperEdges". Thus it's another motivation for us to do research on this SuperHyperModel based on the "Cancer's Recognition". Sometimes, the situations get worst. The situation is passed from the certainty and precise style. Thus it's the beyond them. There are three descriptions, namely, the degrees of determinacy, indeterminacy and neutrality, for any object based on vague forms, namely, incomplete data, imprecise data, and uncertain analysis. The latter model could be considered on the previous SuperHyperModel. It's SuperHyperModel. It's SuperHyperGraph but it's officially called "Extreme SuperHyperGraphs". The cancer is the disease but the model is going to figure out what's going on this phenomenon. The special case of this disease is considered and as the consequences of the model, some parameters are used. The cells are under attack of this disease but the moves of the cancer in the special region are the matter of mind. The recognition of the cancer could help to find some treatments for this disease. The SuperHyperGraph and Extreme SuperHyperGraph are the SuperHyperModels on the "Cancer's Recognition" and both bases are the background of this research. Sometimes the cancer has been happened on the region, full of cells, groups of cells and embedded styles. In this segment, the SuperHyperModel proposes some SuperHyperNotions based on the connectivities of the moves of the cancer in the forms of alliances' styles with the formation of the design and the architecture are formally called " SuperHyperDominating" in the themes of jargons and buzzwords. The prefix "SuperHyper" refers to the theme of the embedded styles to figure out the background for the SuperHyperNotions. The recognition of the cancer in the long-term function. The specific region has been assigned by the model [it's called SuperHyperGraph] and the long cycle of the move

from the cancer is identified by this research. Sometimes the move of the cancer hasn't be easily 1040  
identified since there are some determinacy, indeterminacy and neutrality about the moves and 1041  
the effects of the cancer on that region; this event leads us to choose another model [it's said to be 1042  
Extreme SuperHyperGraph] to have convenient perception on what's happened and what's done. 1043  
There are some specific models, which are well-known and they've got the names, and some general 1044  
models. The moves and the traces of the cancer on the complex tracks and between complicated 1045  
groups of cells could be fantasized by a Extreme SuperHyperPath (-/SuperHyperDominating, 1046  
SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). The aim 1047  
is to find either the optimal SuperHyperDominating or the Extreme SuperHyperDominating 1048  
in those Extreme SuperHyperModels. Some general results are introduced. Beyond that in 1049  
SuperHyperStar, all possible Extreme SuperHyperPath s have only two SuperHyperEdges but 1050  
it's not enough since it's essential to have at least three SuperHyperEdges to form any style of a 1051  
SuperHyperDominating. There isn't any formation of any SuperHyperDominating but literarily, 1052  
it's the deformation of any SuperHyperDominating. It, literarily, deforms and it doesn't form. 1053

**Question 8.0.1.** *How to define the SuperHyperNotions and to do research on them to find the “ 1054  
amount of SuperHyperDominating” of either individual of cells or the groups of cells based on the 1055  
fixed cell or the fixed group of cells, extensively, the “amount of SuperHyperDominating” based 1056  
on the fixed groups of cells or the fixed groups of group of cells? 1057*

**Question 8.0.2.** *What are the best descriptions for the “Cancer's Recognition” in terms of these 1058  
messy and dense SuperHyperModels where embedded notions are illustrated? 1059*

It's motivation to find notions to use in this dense model is titled “SuperHyperGraphs”. 1060  
Thus it motivates us to define different types of “ SuperHyperDominating” and “Extreme 1061  
SuperHyperDominating” on “SuperHyperGraph” and “Extreme SuperHyperGraph”. Then the 1062  
research has taken more motivations to define SuperHyperClasses and to find some connections 1063  
amid this SuperHyperNotion with other SuperHyperNotions. It motivates us to get some instances 1064  
and examples to make clarifications about the framework of this research. The general results 1065  
and some results about some connections are some avenues to make key point of this research, 1066  
“Cancer's Recognition”, more understandable and more clear. 1067

The framework of this research is as follows. In the beginning, I introduce basic definitions to clarify 1068  
about preliminaries. In the subsection “Preliminaries”, initial definitions about SuperHyperGraphs 1069  
and Extreme SuperHyperGraph are deeply-introduced and in-depth-discussed. The elementary 1070  
concepts are clarified and illustrated completely and sometimes review literature are applied to 1071  
make sense about what's going to figure out about the upcoming sections. The main definitions and 1072  
their clarifications alongside some results about new notions, SuperHyperDominating and Extreme 1073  
SuperHyperDominating, are figured out in sections “ SuperHyperDominating” and “Extreme 1074  
SuperHyperDominating”. In the sense of tackling on getting results and in order to make sense 1075  
about continuing the research, the ideas of SuperHyperUniform and Extreme SuperHyperUniform 1076  
are introduced and as their consequences, corresponded SuperHyperClasses are figured out to 1077  
debut what's done in this section, titled “Results on SuperHyperClasses” and “Results on Extreme 1078  
SuperHyperClasses”. As going back to origin of the notions, there are some smart steps toward 1079  
the common notions to extend the new notions in new frameworks, SuperHyperGraph and 1080  
Extreme SuperHyperGraph, in the sections “Results on SuperHyperClasses” and “Results on 1081  
Extreme SuperHyperClasses”. The starter research about the general SuperHyperRelations and 1082  
as concluding and closing section of theoretical research are contained in the section “General 1083  
Results”. Some general SuperHyperRelations are fundamental and they are well-known as 1084

fundamental SuperHyperNotions as elicited and discussed in the sections, “General Results”, “ 1085  
SuperHyperDominating”, “Extreme SuperHyperDominating”, “Results on SuperHyperClasses” 1086  
and “Results on Extreme SuperHyperClasses”. There are curious questions about what’s done 1087  
about the SuperHyperNotions to make sense about excellency of this research and going to 1088  
figure out the word “best” as the description and adjective for this research as presented 1089  
in section, “ SuperHyperDominating”. The keyword of this research debut in the section 1090  
“Applications in Cancer’s Recognition” with two cases and subsections “Case 1: The Initial Steps 1091  
Toward SuperHyperBipartite as SuperHyperModel” and “Case 2: The Increasing Steps Toward 1092  
SuperHyperMultipartite as SuperHyperModel”. In the section, “Open Problems”, there are some 1093  
scrutiny and discernment on what’s done and what’s happened in this research in the terms 1094  
of “questions” and “problems” to make sense to figure out this research in featured style. The 1095  
advantages and the limitations of this research alongside about what’s done in this research to 1096  
make sense and to get sense about what’s figured out are included in the section, “Conclusion 1097  
and Closing Remarks”. 1098



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## Extreme Preliminaries Of This Scientific Research On the Redeemed Ways

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In this section, the basic material in this scientific research, is referred to [Single Valued Neutrosophic Set](Ref.[HG38],Definition 2.2,p.2), [Neutrosophic Set](Ref.[HG38],Definition 2.1,p.1), [Neutrosophic SuperHyperGraph (NSHG)](Ref.[HG38],Definition 2.5,p.2), [Characterization of the Neutrosophic SuperHyperGraph (NSHG)](Ref.[HG38],Definition 2.7,p.3), [t-norm](Ref.[HG38], Definition 2.7, p.3), and [Characterization of the Neutrosophic SuperHyperGraph (NSHG)](Ref.[HG38],Definition 2.7,p.3), [Neutrosophic Strength of the Neutrosophic SuperHyperPaths] (Ref.[HG38],Definition 5.3,p.7), and [Different Neutrosophic Types of Neutrosophic SuperHyperEdges (NSHE)] (Ref.[HG38],Definition 5.4,p.7). Also, the new ideas and their clarifications are addressed to Ref.[HG38].

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In this subsection, the basic material which is used in this scientific research, is presented. Also, the new ideas and their clarifications are elicited.

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**Definition 9.0.1** (Neutrosophic Set). (Ref.[HG38],Definition 2.1,p.1).

Let  $X$  be a space of points (objects) with generic elements in  $X$  denoted by  $x$ ; then the **Neutrosophic set**  $A$  (NS  $A$ ) is an object having the form

$$A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$$

where the functions  $T, I, F : X \rightarrow ]^{-}0, 1^{+}[$  define respectively the a **truth-membership function**, an **indeterminacy-membership function**, and a **falsity-membership function** of the element  $x \in X$  to the set  $A$  with the condition

$$^{-}0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3^{+}.$$

The functions  $T_A(x), I_A(x)$  and  $F_A(x)$  are real standard or nonstandard subsets of  $]^{-}0, 1^{+}[$ .

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**Definition 9.0.2** (Single Valued Neutrosophic Set). (Ref.[HG38],Definition 2.2,p.2).

Let  $X$  be a space of points (objects) with generic elements in  $X$  denoted by  $x$ . A **single valued Neutrosophic set**  $A$  (SVNS  $A$ ) is characterized by truth-membership function  $T_A(x)$ , an indeterminacy-membership function  $I_A(x)$ , and a falsity-membership function  $F_A(x)$ . For each point  $x$  in  $X$ ,  $T_A(x), I_A(x), F_A(x) \in [0, 1]$ . A SVNS  $A$  can be written as

$$A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}.$$

**Definition 9.0.3.** The **degree of truth-membership, indeterminacy-membership and falsity-membership of the subset**  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$ :

$$T_A(X) = \min[T_A(v_i), T_A(v_j)]_{v_i, v_j \in X},$$

$$I_A(X) = \min[I_A(v_i), I_A(v_j)]_{v_i, v_j \in X},$$

and  $F_A(X) = \min[F_A(v_i), F_A(v_j)]_{v_i, v_j \in X}.$

**Definition 9.0.4.** The **support** of  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$ :

$$\text{supp}(X) = \{x \in X : T_A(x), I_A(x), F_A(x) > 0\}.$$

**Definition 9.0.5** (Neutrosophic SuperHyperGraph (NSHG)). (Ref.[HG38], Definition 2.5, p.2). 1114  
 Assume  $V'$  is a given set. a **Neutrosophic SuperHyperGraph** (NSHG)  $S$  is an ordered pair 1115  
 $S = (V, E)$ , where 1116

- (i)  $V = \{V_1, V_2, \dots, V_n\}$  a finite set of finite single valued Neutrosophic subsets of  $V'$ ; 1117
- (ii)  $V = \{(V_i, T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i)) : T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i) \geq 0\}$ ,  $(i = 1, 2, \dots, n)$ ; 1118
- (iii)  $E = \{E_1, E_2, \dots, E_{n'}\}$  a finite set of finite single valued Neutrosophic subsets of  $V$ ; 1119
- (iv)  $E = \{(E_{i'}, T_{V'}(E_{i'}), I_{V'}(E_{i'}), F_{V'}(E_{i'})) : T_{V'}(E_{i'}), I_{V'}(E_{i'}), F_{V'}(E_{i'}) \geq 0\}$ ,  $(i' = 1, 2, \dots, n')$ ; 1120
- (v)  $V_i \neq \emptyset$ ,  $(i = 1, 2, \dots, n)$ ; 1121
- (vi)  $E_{i'} \neq \emptyset$ ,  $(i' = 1, 2, \dots, n')$ ; 1122
- (vii)  $\sum_i \text{supp}(V_i) = V$ ,  $(i = 1, 2, \dots, n)$ ; 1123
- (viii)  $\sum_{i'} \text{supp}(E_{i'}) = V$ ,  $(i' = 1, 2, \dots, n')$ ; 1124
- (ix) and the following conditions hold:

$$T_{V'}(E_{i'}) \leq \min[T_{V'}(V_i), T_{V'}(V_j)]_{V_i, V_j \in E_{i'}},$$

$$I_{V'}(E_{i'}) \leq \min[I_{V'}(V_i), I_{V'}(V_j)]_{V_i, V_j \in E_{i'}},$$

and  $F_{V'}(E_{i'}) \leq \min[F_{V'}(V_i), F_{V'}(V_j)]_{V_i, V_j \in E_{i'}}$

where  $i' = 1, 2, \dots, n'$ . 1125

Here the Neutrosophic SuperHyperEdges (NSHE)  $E_{j'}$  and the Neutrosophic SuperHyperVertices 1126  
 (NSHV)  $V_j$  are single valued Neutrosophic sets.  $T_{V'}(V_i)$ ,  $I_{V'}(V_i)$ , and  $F_{V'}(V_i)$  denote the 1127  
 degree of truth-membership, the degree of indeterminacy-membership and the degree of 1128  
 falsity-membership the Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to the Neutrosophic 1129  
 SuperHyperVertex (NSHV)  $V$ .  $T_{V'}(E_{i'})$ ,  $I_{V'}(E_{i'})$ , and  $F_{V'}(E_{i'})$  denote the degree of truth- 1130  
 membership, the degree of indeterminacy-membership and the degree of falsity-membership 1131  
 of the Neutrosophic SuperHyperEdge (NSHE)  $E_{i'}$  to the Neutrosophic SuperHyperEdge (NSHE) 1132  
 $E$ . Thus, the  $ii'$ th element of the **incidence matrix** of Neutrosophic SuperHyperGraph (NSHG) 1133  
 are of the form  $(V_i, T_{V'}(E_{i'}), I_{V'}(E_{i'}), F_{V'}(E_{i'}))$ , the sets  $V$  and  $E$  are crisp sets. 1134

**Definition 9.0.6** (Characterization of the Neutrosophic SuperHyperGraph (NSHG)). 1135  
(Ref.[HG38], Definition 2.7, p.3). 1136

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . The 1137  
Neutrosophic SuperHyperEdges (NSHE)  $E_{i'}$  and the Neutrosophic SuperHyperVertices (NSHV) 1138  
 $V_i$  of Neutrosophic SuperHyperGraph (NSHG)  $S = (V, E)$  could be characterized as follow-up 1139  
items. 1140

- (i) If  $|V_i| = 1$ , then  $V_i$  is called **vertex**; 1141
- (ii) if  $|V_i| \geq 1$ , then  $V_i$  is called **SuperVertex**; 1142
- (iii) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **edge**; 1143
- (iv) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **HyperEdge**; 1144
- (v) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called 1145  
**SuperEdge**; 1146
- (vi) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called 1147  
**SuperHyperEdge**. 1148

If we choose different types of binary operations, then we could get hugely diverse types of 1149  
general forms of Neutrosophic SuperHyperGraph (NSHG). 1150

**Definition 9.0.7** (t-norm). (Ref.[HG38], Definition 2.7, p.3). 1151

A binary operation  $\otimes : [0, 1] \times [0, 1] \rightarrow [0, 1]$  is a **t-norm** if it satisfies the following for 1152  
 $x, y, z, w \in [0, 1]$ : 1153

- (i)  $1 \otimes x = x$ ; 1154
- (ii)  $x \otimes y = y \otimes x$ ; 1155
- (iii)  $x \otimes (y \otimes z) = (x \otimes y) \otimes z$ ; 1156
- (iv) If  $w \leq x$  and  $y \leq z$  then  $w \otimes y \leq x \otimes z$ . 1157

**Definition 9.0.8.** The **degree of truth-membership, indeterminacy-membership and falsity-membership of the subset**  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$  (with respect to t-norm  $T_{norm}$ ):

$$T_A(X) = T_{norm}[T_A(v_i), T_A(v_j)]_{v_i, v_j \in X},$$

$$I_A(X) = T_{norm}[I_A(v_i), I_A(v_j)]_{v_i, v_j \in X},$$

and  $F_A(X) = T_{norm}[F_A(v_i), F_A(v_j)]_{v_i, v_j \in X}$ .

**Definition 9.0.9.** The **support** of  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$ :

$$supp(X) = \{ x \in X : T_A(x), I_A(x), F_A(x) > 0 \}.$$

**Definition 9.0.10.** (General Forms of Neutrosophic SuperHyperGraph (NSHG)). 1158

Assume  $V'$  is a given set. a **Neutrosophic SuperHyperGraph** (NSHG)  $S$  is an ordered pair 1159  
 $S = (V, E)$ , where 1160

- (i)  $V = \{V_1, V_2, \dots, V_n\}$  a finite set of finite single valued Neutrosophic subsets of  $V'$ ; 1161
- (ii)  $V = \{(V_i, T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i)) : T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i) \geq 0\}$ ,  $(i = 1, 2, \dots, n)$ ; 1162
- (iii)  $E = \{E_1, E_2, \dots, E_{n'}\}$  a finite set of finite single valued Neutrosophic subsets of  $V$ ; 1163
- (iv)  $E = \{(E_{i'}, T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'})) : T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'}) \geq 0\}$ ,  $(i' = 1, 2, \dots, n')$ ; 1164
- (v)  $V_i \neq \emptyset$ ,  $(i = 1, 2, \dots, n)$ ; 1165
- (vi)  $E_{i'} \neq \emptyset$ ,  $(i' = 1, 2, \dots, n')$ ; 1166
- (vii)  $\sum_i \text{supp}(V_i) = V$ ,  $(i = 1, 2, \dots, n)$ ; 1167
- (viii)  $\sum_{i'} \text{supp}(E_{i'}) = V$ ,  $(i' = 1, 2, \dots, n')$ . 1168

Here the Neutrosophic SuperHyperEdges (NSHE)  $E_{j'}$  and the Neutrosophic SuperHyperVertices (NSHV)  $V_j$  are single valued Neutrosophic sets.  $T_{V'}(V_i), I_{V'}(V_i)$ , and  $F_{V'}(V_i)$  denote the degree of truth-membership, the degree of indeterminacy-membership and the degree of falsity-membership the Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to the Neutrosophic SuperHyperVertex (NSHV)  $V$ .  $T'_{V'}(E_{i'}), I'_{V'}(E_{i'})$ , and  $F'_{V'}(E_{i'})$  denote the degree of truth-membership, the degree of indeterminacy-membership and the degree of falsity-membership of the Neutrosophic SuperHyperEdge (NSHE)  $E_{i'}$  to the Neutrosophic SuperHyperEdge (NSHE)  $E$ . Thus, the  $ii'$ th element of the **incidence matrix** of Neutrosophic SuperHyperGraph (NSHG) are of the form  $(V_i, T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'}))$ , the sets  $V$  and  $E$  are crisp sets. 1171-1177

**Definition 9.0.11** (Characterization of the Neutrosophic SuperHyperGraph (NSHG)). (Ref.[HG38], Definition 2.7,p.3). 1178-1179

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . The Neutrosophic SuperHyperEdges (NSHE)  $E_{i'}$  and the Neutrosophic SuperHyperVertices (NSHV)  $V_i$  of Neutrosophic SuperHyperGraph (NSHG)  $S = (V, E)$  could be characterized as follow-up items. 1180-1183

- (i) If  $|V_i| = 1$ , then  $V_i$  is called **vertex**; 1184
- (ii) if  $|V_i| \geq 1$ , then  $V_i$  is called **SuperVertex**; 1185
- (iii) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **edge**; 1186
- (iv) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **HyperEdge**; 1187
- (v) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **SuperEdge**; 1188-1189
- (vi) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **SuperHyperEdge**. 1190-1191

This SuperHyperModel is too messy and too dense. Thus there's a need to have some restrictions and conditions on SuperHyperGraph. The special case of this SuperHyperGraph makes the patterns and regularities. 1192-1194

**Definition 9.0.12.** A graph is **SuperHyperUniform** if it's SuperHyperGraph and the number of elements of SuperHyperEdges are the same. 1195-1196

To get more visions on SuperHyperUniform, the some SuperHyperClasses are introduced. It makes to have SuperHyperUniform more understandable.

**Definition 9.0.13.** Assume a Neutrosophic SuperHyperGraph. There are some SuperHyperClasses as follows.

- (i). It's **Neutrosophic SuperHyperPath** if it's only one SuperVertex as intersection amid two given SuperHyperEdges with two exceptions;
- (ii). it's **SuperHyperCycle** if it's only one SuperVertex as intersection amid two given SuperHyperEdges;
- (iii). it's **SuperHyperStar** it's only one SuperVertex as intersection amid all SuperHyperEdges;
- (iv). it's **SuperHyperBipartite** it's only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, forming two separate sets, has no SuperHyperEdge in common;
- (v). it's **SuperHyperMultiPartite** it's only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, forming multi separate sets, has no SuperHyperEdge in common;
- (vi). it's **SuperHyperWheel** if it's only one SuperVertex as intersection amid two given SuperHyperEdges and one SuperVertex has one SuperHyperEdge with any common SuperVertex.

**Definition 9.0.14.** Let an ordered pair  $S = (V, E)$  be a Neutrosophic SuperHyperGraph (NSHG)  $S$ . Then a sequence of Neutrosophic SuperHyperVertices (NSHV) and Neutrosophic SuperHyperEdges (NSHE)

$$V_1, E_1, V_2, E_2, V_3, \dots, V_{s-1}, E_{s-1}, V_s$$

is called a **Neutrosophic SuperHyperPath** (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_1$  to Neutrosophic SuperHyperVertex (NSHV)  $V_s$  if either of following conditions hold:

- (i)  $V_i, V_{i+1} \in E_{i'}$ ;
- (ii) there's a vertex  $v_i \in V_i$  such that  $v_i, V_{i+1} \in E_{i'}$ ;
- (iii) there's a SuperVertex  $V'_i \in V_i$  such that  $V'_i, V_{i+1} \in E_{i'}$ ;
- (iv) there's a vertex  $v_{i+1} \in V_{i+1}$  such that  $V_i, v_{i+1} \in E_{i'}$ ;
- (v) there's a SuperVertex  $V'_{i+1} \in V_{i+1}$  such that  $V_i, V'_{i+1} \in E_{i'}$ ;
- (vi) there are a vertex  $v_i \in V_i$  and a vertex  $v_{i+1} \in V_{i+1}$  such that  $v_i, v_{i+1} \in E_{i'}$ ;
- (vii) there are a vertex  $v_i \in V_i$  and a SuperVertex  $V'_{i+1} \in V_{i+1}$  such that  $v_i, V'_{i+1} \in E_{i'}$ ;
- (viii) there are a SuperVertex  $V'_i \in V_i$  and a vertex  $v_{i+1} \in V_{i+1}$  such that  $V'_i, v_{i+1} \in E_{i'}$ ;
- (ix) there are a SuperVertex  $V'_i \in V_i$  and a SuperVertex  $V'_{i+1} \in V_{i+1}$  such that  $V'_i, V'_{i+1} \in E_{i'}$ .

**Definition 9.0.15.** (Characterization of the Neutrosophic SuperHyperPaths).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . a Neutrosophic SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_1$  to Neutrosophic SuperHyperVertex (NSHV)  $V_s$  is sequence of Neutrosophic SuperHyperVertices (NSHV) and Neutrosophic SuperHyperEdges (NSHE)

$$V_1, E_1, V_2, E_2, V_3, \dots, V_{s-1}, E_{s-1}, V_s,$$

could be characterized as follow-up items.

- (i) If for all  $V_i, E_{j'}, |V_i| = 1, |E_{j'}| = 2$ , then NSHP is called **path**;
- (ii) if for all  $E_{j'}, |E_{j'}| = 2$ , and there's  $V_i, |V_i| \geq 1$ , then NSHP is called **SuperPath**;
- (iii) if for all  $V_i, E_{j'}, |V_i| = 1, |E_{j'}| \geq 2$ , then NSHP is called **HyperPath**;
- (iv) if there are  $V_i, E_{j'}, |V_i| \geq 1, |E_{j'}| \geq 2$ , then NSHP is called **Neutrosophic SuperHyper-Path** .

**Definition 9.0.16** (Neutrosophic Strength of the Neutrosophic SuperHyperPaths). (Ref.[HG38],Definition 5.3,p.7).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . A Neutrosophic SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_1$  to Neutrosophic SuperHyperVertex (NSHV)  $V_s$  is sequence of Neutrosophic SuperHyperVertices (NSHV) and Neutrosophic SuperHyperEdges (NSHE)

$$V_1, E_1, V_2, E_2, V_3, \dots, V_{s-1}, E_{s-1}, V_s,$$

have

- (i) **Neutrosophic t-strength**  $(\min\{T(V_i)\}, m, n)_{i=1}^s$ ;
- (ii) **Neutrosophic i-strength**  $(m, \min\{I(V_i)\}, n)_{i=1}^s$ ;
- (iii) **Neutrosophic f-strength**  $(m, n, \min\{F(V_i)\})_{i=1}^s$ ;
- (iv) **Neutrosophic strength**  $(\min\{T(V_i)\}, \min\{I(V_i)\}, \min\{F(V_i)\})_{i=1}^s$ .

**Definition 9.0.17** (Different Neutrosophic Types of Neutrosophic SuperHyperEdges (NSHE)). (Ref.[HG38],Definition 5.4,p.7).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called

- (ix) **Neutrosophic t-connective** if  $T(E) \geq$  maximum number of Neutrosophic t-strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ ;
- (x) **Neutrosophic i-connective** if  $I(E) \geq$  maximum number of Neutrosophic i-strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ ;

- (xi) **Neutrosophic f-connective** if  $F(E) \geq$  maximum number of Neutrosophic f-strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ ;
- (xii) **Neutrosophic connective** if  $(T(E), I(E), F(E)) \geq$  maximum number of Neutrosophic strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ .

**Definition 9.0.18.** (Different Neutrosophic Types of Neutrosophic SuperHyperDominating).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  is called

- (i) **Neutrosophic e-SuperHyperDominating** if  $\forall E_i \in E_{NSHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that  $V_a \in E_i, E_j$ ;
- (ii) **Neutrosophic re-SuperHyperDominating** if  $\forall E_i \in E_{NSHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that  $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ;
- (iii) **Neutrosophic v-SuperHyperDominating** if  $\forall V_i \in E_{NSHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ;
- (iv) **Neutrosophic rv-SuperHyperDominating** if  $\forall V_i \in E_{NSHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ;
- (v) **Neutrosophic SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating.

**Definition 9.0.19.** ((Neutrosophic) SuperHyperDominating).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called

- (i) an **Extreme SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating;
- (ii) a **Neutrosophic SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating;

- (iii) an **Extreme SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; and the Extreme power is corresponded to its Extreme coefficient;
- (iv) a **Neutrosophic SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient;
- (v) an **Extreme V-SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating;
- (vi) a **Neutrosophic V-SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating;
- (vii) an **Extreme V-SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; and the Extreme power is corresponded to its Extreme coefficient;
- (viii) a **Neutrosophic SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neut-

rosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient.

**Definition 9.0.20.** ((Extreme/Neutrosophic) $\delta$ -SuperHyperDominating). Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Then

- (i) an  $\delta$ -**SuperHyperDominating** is a Neutrosophic kind of Neutrosophic SuperHyperDominating such that either of the following expressions hold for the Neutrosophic cardinalities of SuperHyperNeighbors of  $s \in S$  :

$$|S \cap N(s)| > |S \cap (V \setminus N(s))| + \delta; \quad \boxed{136EQN1}$$

$$|S \cap N(s)| < |S \cap (V \setminus N(s))| + \delta. \quad \boxed{136EQN2}$$

The Expression (28.1), holds if  $S$  is an  $\delta$ -**SuperHyperOffensive**. And the Expression (28.1), holds if  $S$  is an  $\delta$ -**SuperHyperDefensive**;

- (ii) a **Neutrosophic  $\delta$ -SuperHyperDominating** is a Neutrosophic kind of Neutrosophic SuperHyperDominating such that either of the following Neutrosophic expressions hold for the Neutrosophic cardinalities of SuperHyperNeighbors of  $s \in S$  :

$$|S \cap N(s)|_{Neutrosophic} > |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta; \quad \boxed{136EQN3}$$

$$|S \cap N(s)|_{Neutrosophic} < |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta. \quad \boxed{136EQN4}$$

The Expression (28.1), holds if  $S$  is a **Neutrosophic  $\delta$ -SuperHyperOffensive**. And the Expression (28.1), holds if  $S$  is a **Neutrosophic  $\delta$ -SuperHyperDefensive**.

For the sake of having a Neutrosophic SuperHyperDominating, there's a need to "redefine" the notion of "Neutrosophic SuperHyperGraph". The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, there's the usage of the position of labels to assign to the values.

**Definition 9.0.21.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . It's redefined **Neutrosophic SuperHyperGraph** if the Table (28.1) holds.

It's useful to define a "Neutrosophic" version of SuperHyperClasses. Since there's more ways to get Neutrosophic type-results to make a Neutrosophic more understandable.

**Definition 9.0.22.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . There are some **Neutrosophic SuperHyperClasses** if the Table (28.2) holds. Thus Neutrosophic SuperHyperPath, SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultiPartite, and SuperHyperWheel, are **Neutrosophic SuperHyperPath**, **Neutrosophic SuperHyperCycle**, **Neutrosophic SuperHyperStar**, **Neutrosophic SuperHyperBipartite**, **Neutrosophic SuperHyperMultiPartite**, and **Neutrosophic SuperHyperWheel** if the Table (28.2) holds.

136DEF1

136DEF2

Table 9.1: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBL3

Table 9.2: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph, Mentioned in the Definition (28.0.22)

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBL4

Table 9.3: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBL1

It's useful to define a "Neutrosophic" version of a Neutrosophic SuperHyperDominating. Since there's more ways to get type-results to make a Neutrosophic SuperHyperDominating more Neutrosophicly understandable.

For the sake of having a Neutrosophic SuperHyperDominating, there's a need to "redefine" the Neutrosophic notion of "Neutrosophic SuperHyperDominating". The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, there's the usage of the position of labels to assign to the values.

136DEF1

**Definition 9.0.23.** Assume a SuperHyperDominating. It's redefined a **Neutrosophic Super-HyperDominating** if the Table (28.3) holds.

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# Extreme SuperHyperDominating But As The Extensions Excerpt From Dense And Super Forms

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**Example 10.0.1.** Assume a Extreme SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned Extreme Figures in every Extreme items.

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- On the Figure (29.1), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.  $E_1$  and  $E_3$  are some empty Extreme SuperHyperEdges but  $E_2$  is a loop Extreme SuperHyperEdge and  $E_4$  is a Extreme SuperHyperEdge. Thus in the terms of Extreme SuperHyperNeighbor, there's only one Extreme SuperHyperEdge, namely,  $E_4$ . The Extreme SuperHyperVertex,  $V_3$  is Extreme isolated means that there's no Extreme SuperHyperEdge has it as a Extreme endpoint. Thus the Extreme SuperHyperVertex,  $V_3$ , is excluded in every given Extreme SuperHyperDominating.

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$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 3z. \end{aligned}$$

1387

- On the Figure (29.2), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.  $E_1, E_2$  and  $E_3$  are some empty Extreme SuperHyperEdges but  $E_4$  is a Extreme SuperHyperEdge. Thus in the terms of Extreme SuperHyperNeighbor, there's only one Extreme SuperHyperEdge, namely,  $E_4$ . The Extreme SuperHyperVertex,  $V_3$  is Extreme isolated means that there's no Extreme SuperHyperEdge has it as a Extreme endpoint. Thus the Extreme SuperHyperVertex,  $V_3$ ,

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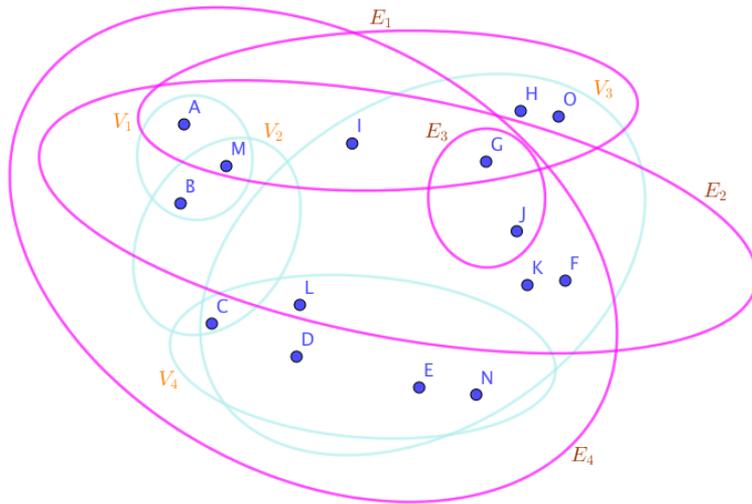


Figure 10.1: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG1

is excluded in every given Extreme SuperHyperDominating.

1394

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-Quasi-SuperHyperDominating SuperHyperPolynomial}} &= 3z. \end{aligned}$$

1395

- On the Figure (29.3), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.

1396

1397

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 3z. \end{aligned}$$

1398

- On the Figure (29.4), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.

1399

1400

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_1, V_4\}. \end{aligned}$$

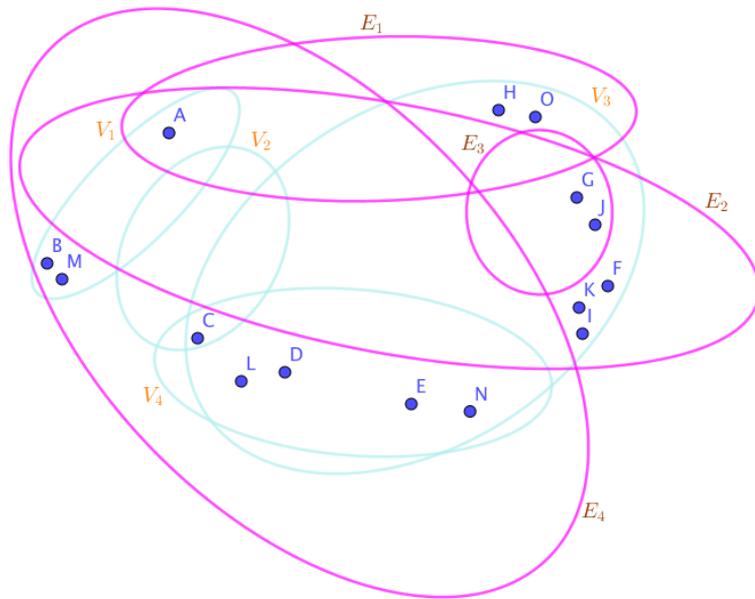


Figure 10.2: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG2

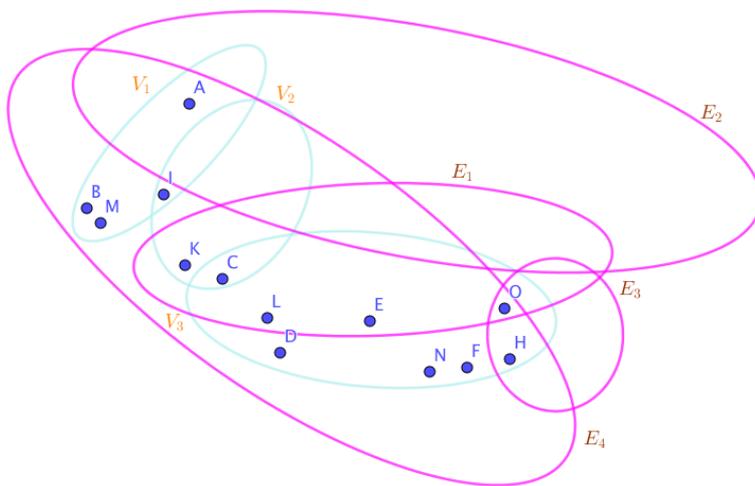


Figure 10.3: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG3

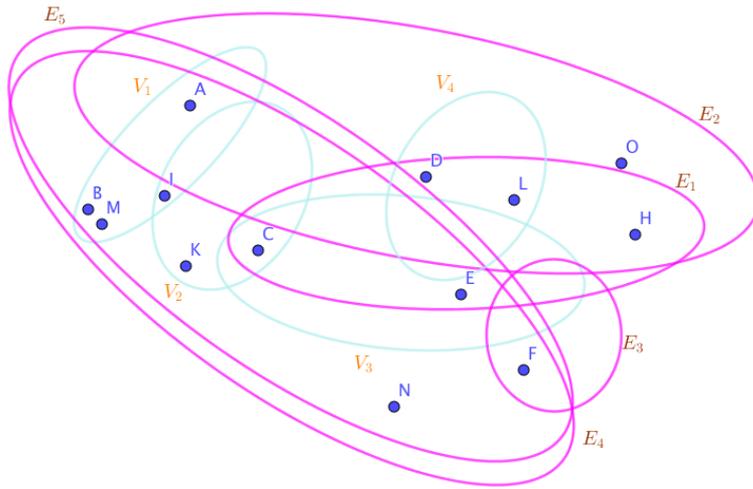


Figure 10.4: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG4

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= \\ 5 \times 3z^2. \end{aligned}$$

1401

- On the Figure (29.5), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1402  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1403

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= z. \end{aligned}$$

1404

- On the Figure (29.6), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1405  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1406

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \\ = \{E_{3i+1_{i=0}^3}, E_{3i+23_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= \\ = 3 \times 3z^8. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \\ = \{V_{3i+1_{i=0}^3}, V_{3i+11_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= \end{aligned}$$

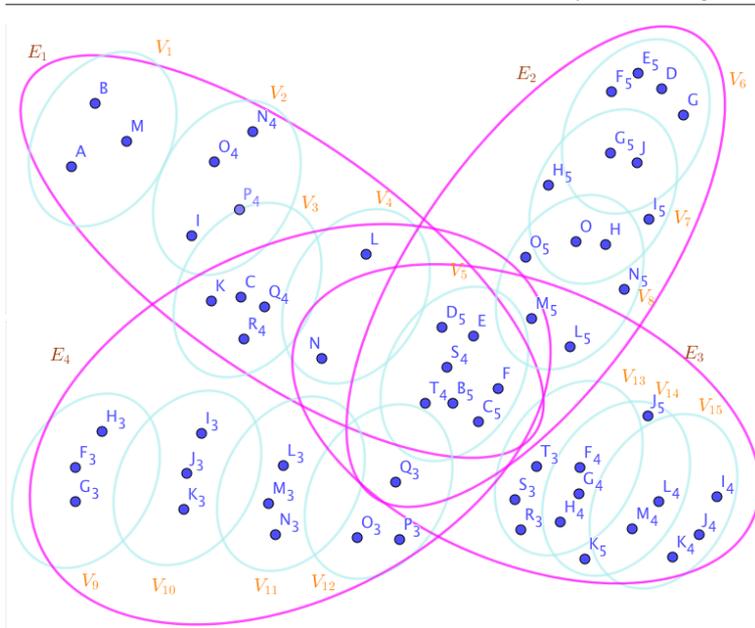


Figure 10.5: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG5

$$= 3 \times 3z^8.$$

1407

- On the Figure (29.7), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward. 1408  
1409

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} = \{E_{15}, E_{16}, E_{17}\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} = 3 \times 3z^3.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} = \{V_3, V_6, V_8\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} = 4 \times 5 \times 5z^3.$$

1410

- On the Figure (29.8), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward. 1411  
1412

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} = \{E_4\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} = z.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} = \{V_3, V_6, V_8\}.$$

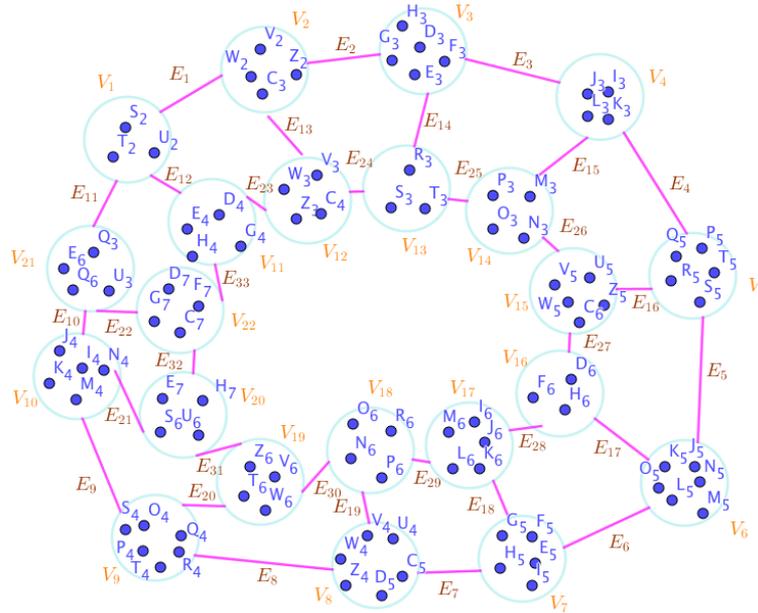


Figure 10.6: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG6

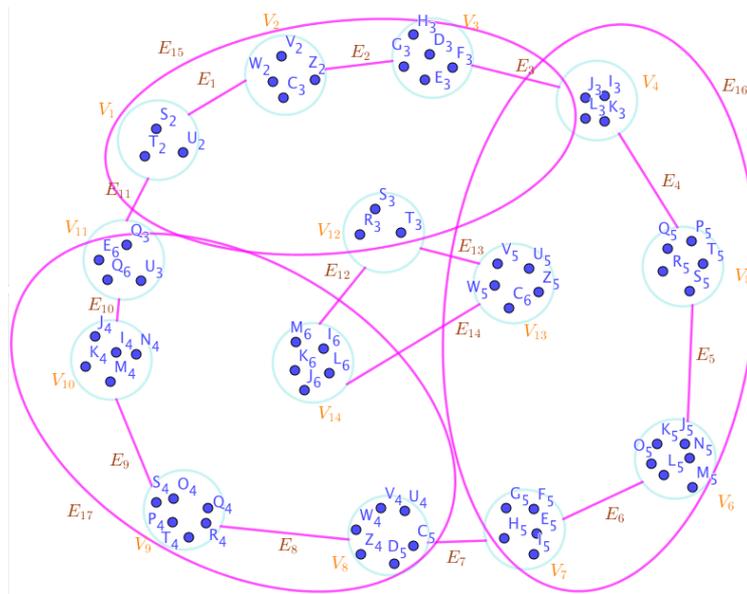


Figure 10.7: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG7

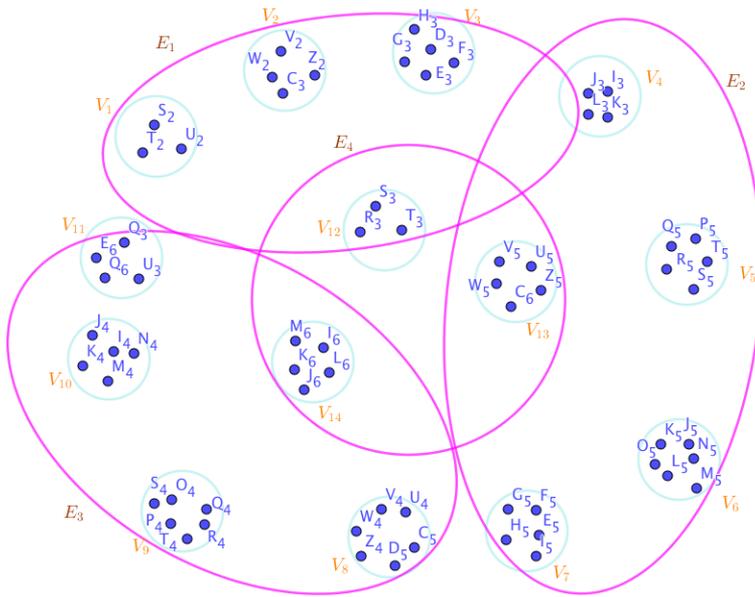


Figure 10.8: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG8

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= \\ &= 4 \times 5 \times 5z^3. \end{aligned}$$

1413

- On the Figure (29.9), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward. 1414  
1415

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_{3i+1}_{i=0}^3, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_{3i+1}_{i=0}^3, V_{11}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 3 \times 11z^5. \end{aligned}$$

1416

- On the Figure (29.10), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1417

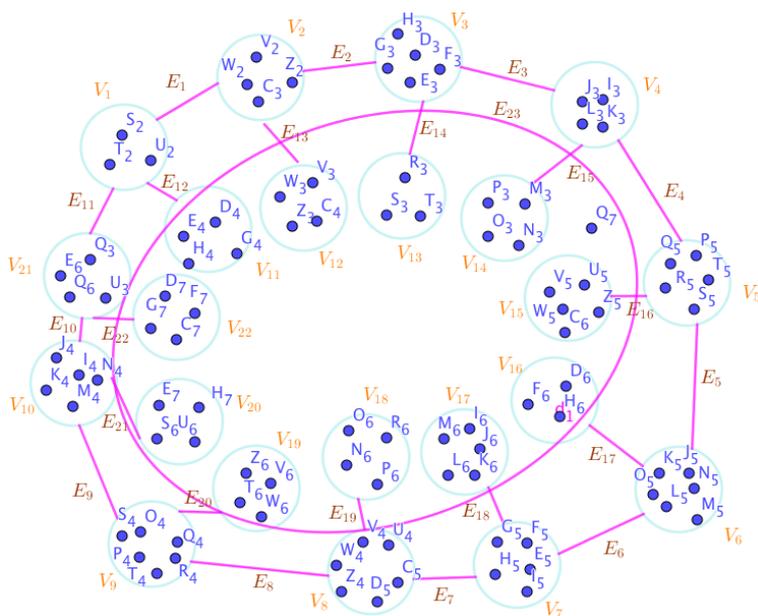


Figure 10.9: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG9

inating, is up. The Extreme Algorithm is Extremely straightforward.

1418

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= \\ &= 4 \times 5 \times 5z^3. \end{aligned}$$

1419

- On the Figure (29.11), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.

1420

1421

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= \\ &= 3 \times 3z^3. \end{aligned}$$

1422

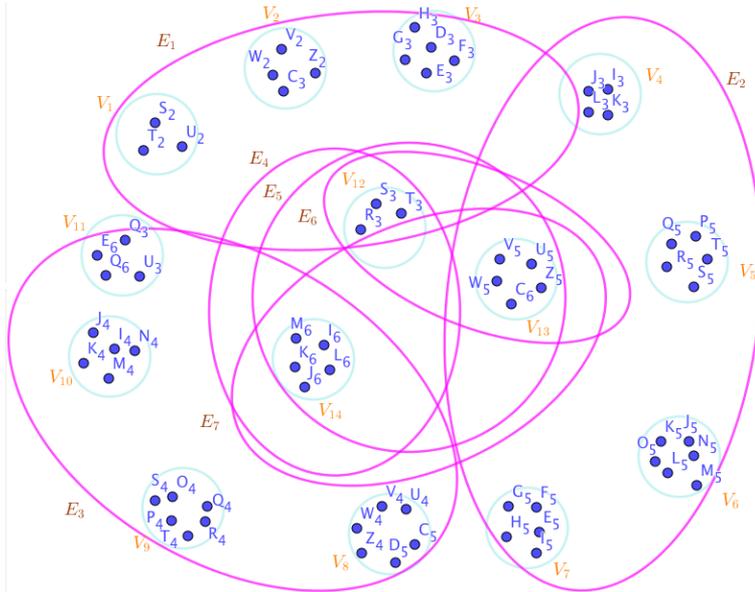


Figure 10.10: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG10

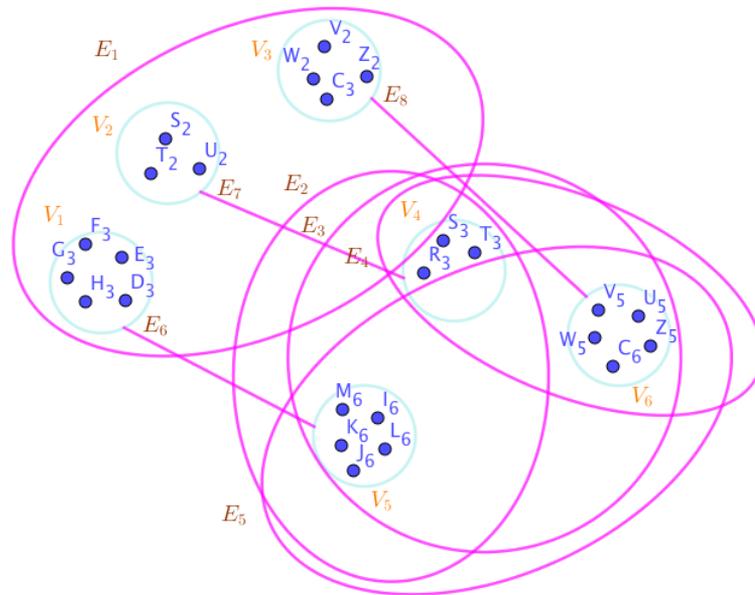


Figure 10.11: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG11

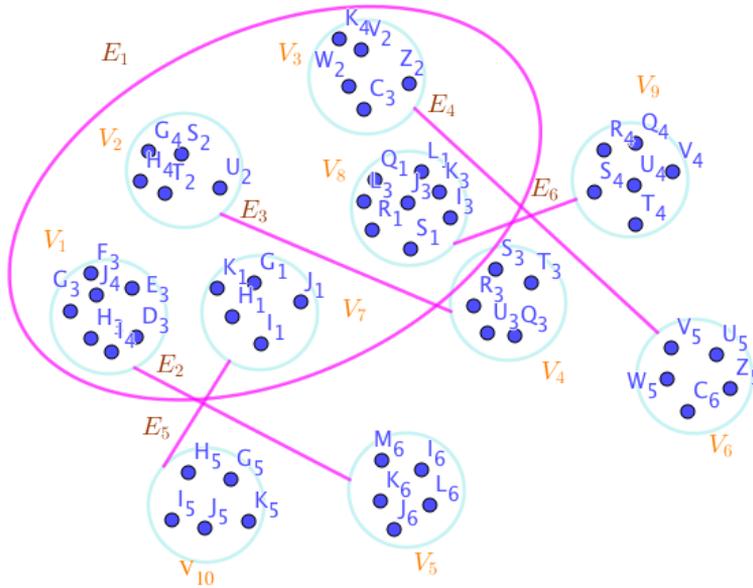


Figure 10.12: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG12

- On the Figure (29.12), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1423  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1424

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_{i=1}^{i \neq 4,5,6}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 5 \times 5z^5. \end{aligned}$$

1425

- On the Figure (29.13), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1426  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1427

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominatingConnected}} &= \{E_3, E_9\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 3 \times 3z^2. \end{aligned}$$

1428

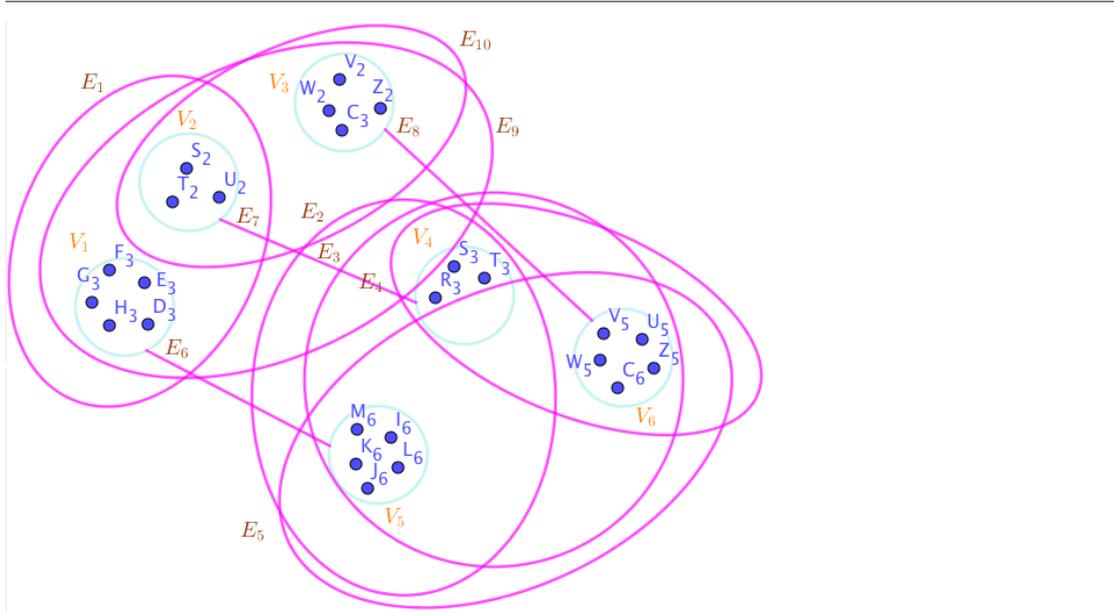


Figure 10.13: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG13

- On the Figure (29.14), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1429  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1430

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= z. \end{aligned}$$

1431

- On the Figure (29.15), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1432  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1433

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= z^2. \end{aligned}$$

1434

- On the Figure (29.16), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1435

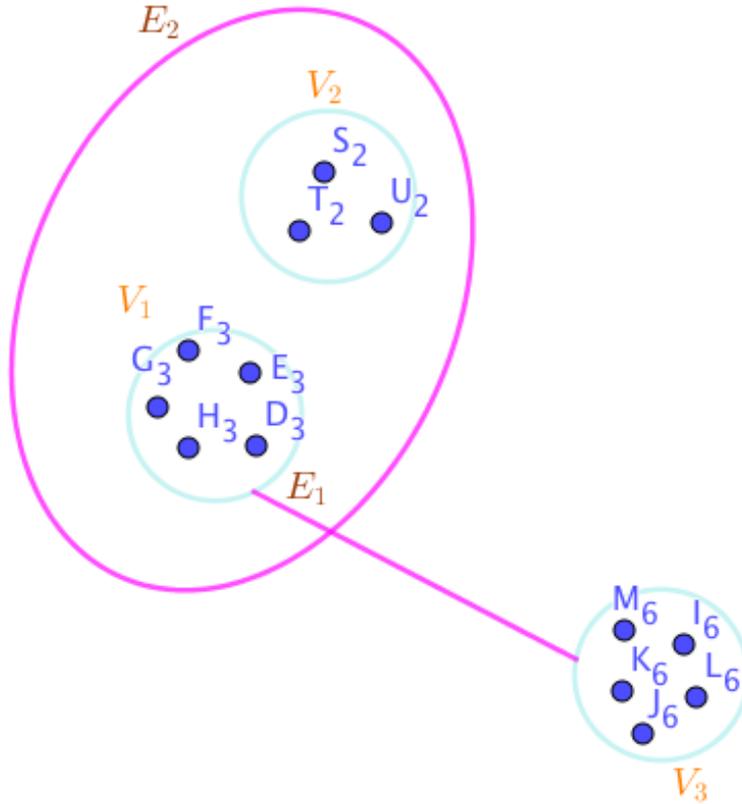


Figure 10.14: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG14

inating, is up. The Extreme Algorithm is Extremely straightforward.

1436

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 4 \times 3z^3. \end{aligned}$$

1437

- On the Figure (29.17), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDom- 1438  
 inating, is up. The Extreme Algorithm is Extremely straightforward. 1439

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z^2. \end{aligned}$$

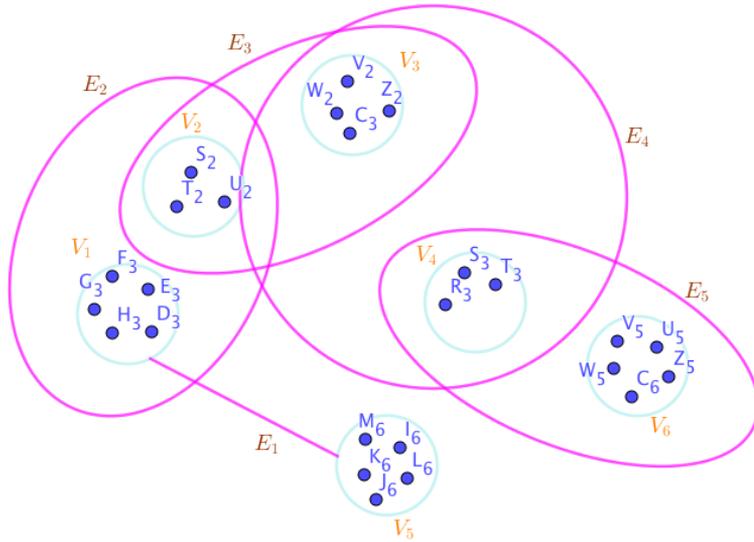


Figure 10.15: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG15

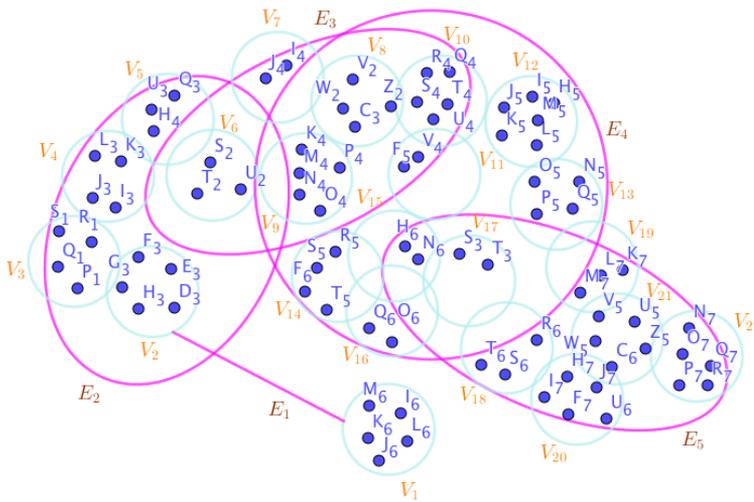


Figure 10.16: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG16

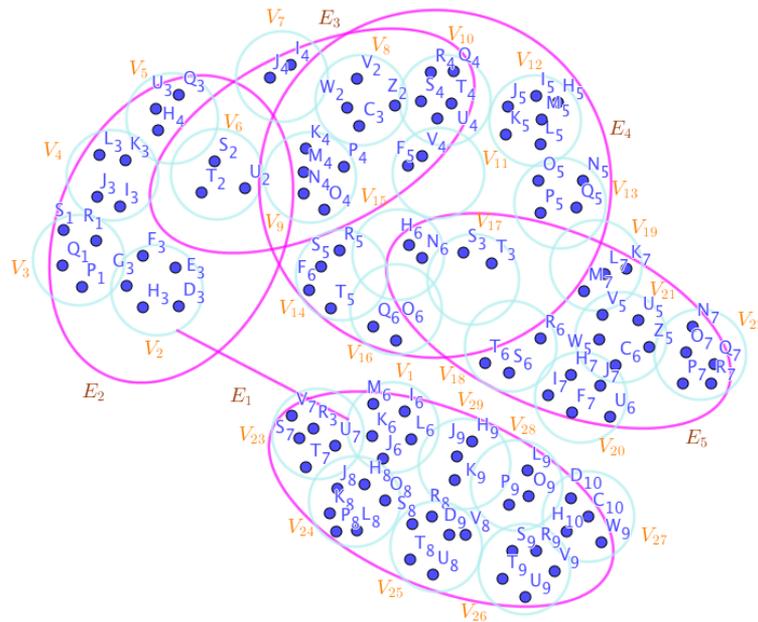


Figure 10.17: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG17

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} = \{V_1, V_2, V_7, V_{17}\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} = 4 \times 3z^4.$$

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- On the Figure (29.18), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward. 1441 1442

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} = \{E_2, E_5\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} = z^2.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} = \{V_1, V_2, V_6, V_{17}\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} = 2 \times 4 \times 3z^4.$$

1443

- On the Figure (29.19), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward. 1444 1445

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} = \{E_{3i+1, i=0,3}\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} = 3z^4.$$

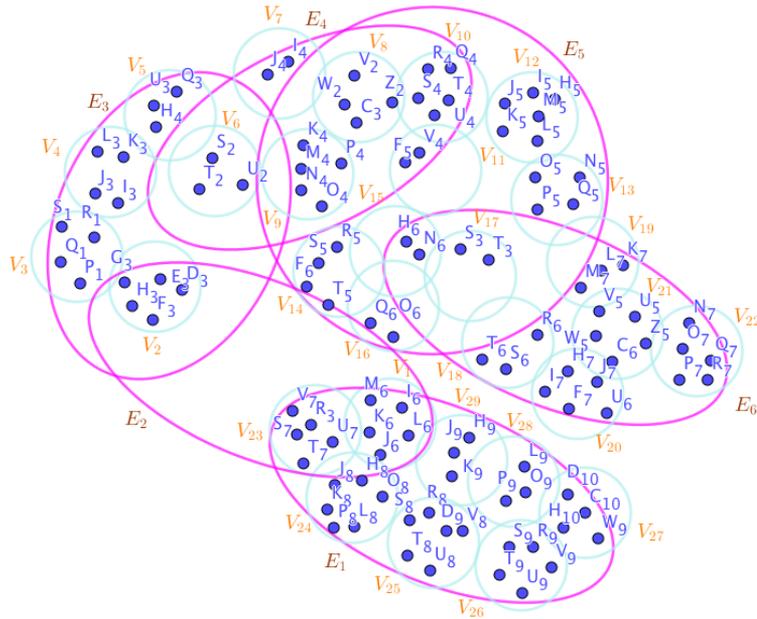


Figure 10.18: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG18

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} = \{V_{3i+1_{i=03}}\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} = 3^4.$$

1446

- On the Figure (29.20), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.

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$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} = \{E_6\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} = 10z.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} = \{V_1\}.$$

$$\mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} = z.$$

1449

- On the Figure (29.21), the Extreme SuperHyperNotion, namely, Extreme SuperHyperDominating, is up. The Extreme Algorithm is Extremely straightforward.

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$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} = \{E_2\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} = z.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} = \{V_1\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} = 10z.$$



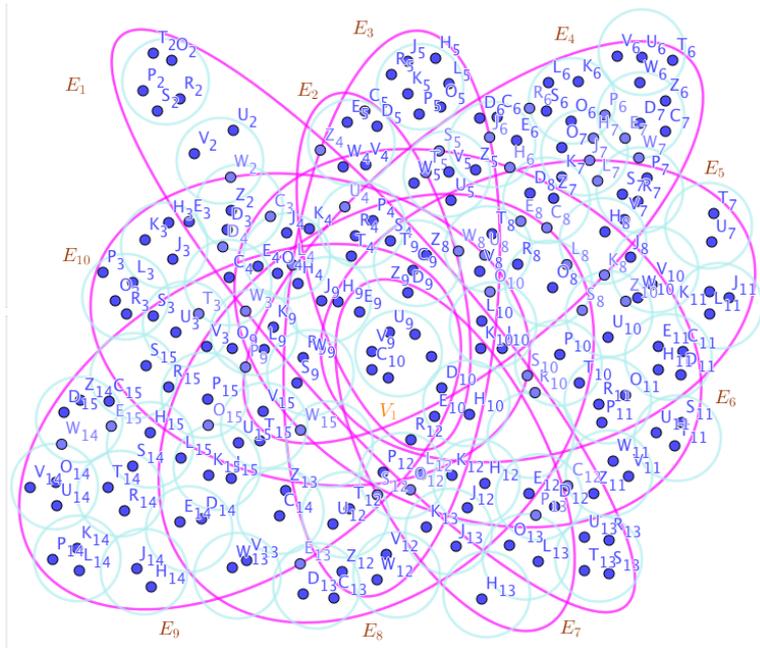


Figure 10.20: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)

136NSHG20

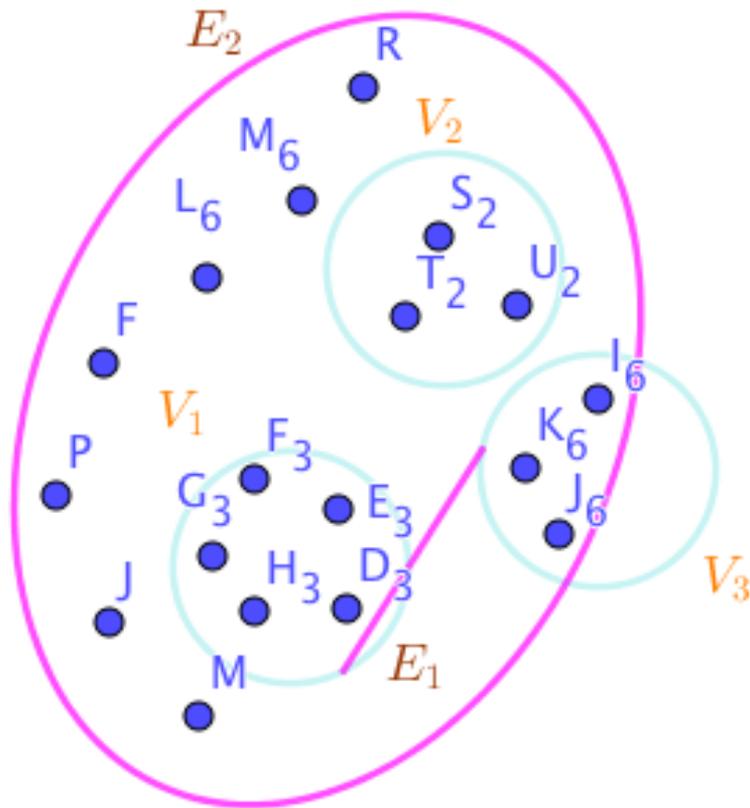


Figure 10.21: The Extreme SuperHyperGraphs Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.3)





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## The Extreme Departures on The Theoretical Results Toward Theoretical Motivations

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The previous Extreme approach apply on the upcoming Extreme results on Extreme SuperHyperClasses. 1460  
1461

**Proposition 11.0.1.** *Assume a connected Extreme SuperHyperPath  $ESHP : (V, E)$ . Then* 1462

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating} = \\
 & = \{E_{3i+1}\}_{i=0}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} . \\
 & \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating\ SuperHyperPolynomial} \\
 & = 3z^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} . \\
 & \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating} \\
 & = \{V^{EXTERNAL}_{3i+1}\}_{i=0}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} . \\
 & \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating\ SuperHyperPolynomial} \\
 & = \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{Extreme\ Cardinality} 3z^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} .
 \end{aligned}$$

*Proof.* Let 1463

$$\begin{aligned}
 & P : \\
 & V_2^{EXTERNAL}, E_2, \\
 & V_3^{EXTERNAL}, E_3, \\
 & \dots, \\
 & E_{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor - 1}, V_{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor}^{EXTERNAL}
 \end{aligned}$$

be a longest path taken from a connected Extreme SuperHyperPath  $ESHP : (V, E)$ . There's a 1464

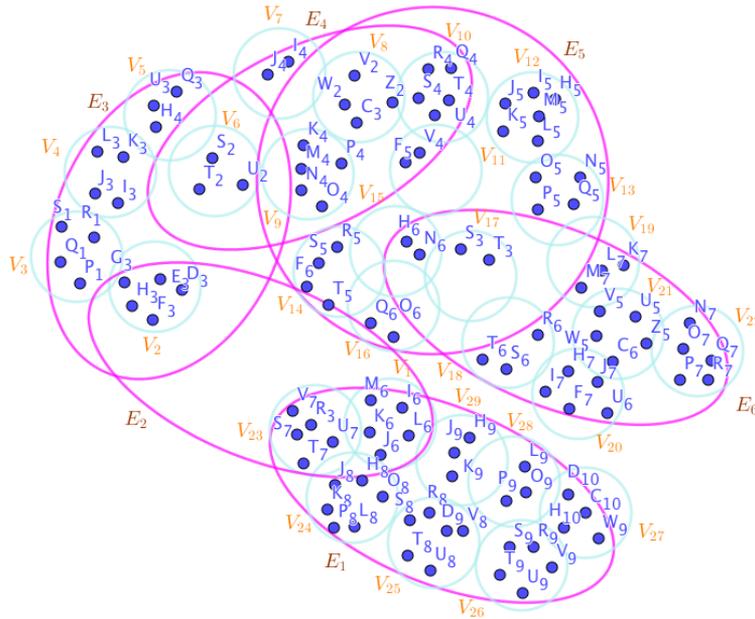


Figure 11.1: a Extreme SuperHyperPath Associated to the Notions of Extreme SuperHyperDominating in the Example (41.0.5)

136NSHG18a

new way to redefine as

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$$\begin{aligned}
 V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. ■

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136EXM18a

**Example 11.0.2.** In the Figure (30.1), the connected Extreme SuperHyperPath  $ESHHP : (V, E)$ , is highlighted and featured. The Extreme SuperHyperSet, in the Extreme SuperHyperModel (30.1), is the SuperHyperDominating.

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**Proposition 11.0.3.** Assume a connected Extreme SuperHyperCycle  $ESHHC : (V, E)$ . Then

1471

$$\begin{aligned}
 \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating} &= \\
 = \{E_{3i+1}\}_{i=0}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} &. \\
 \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating\ SuperHyperPolynomial} & \\
 = 3z^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} &. \\
 \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating} &
 \end{aligned}$$

$$\begin{aligned}
 &= \{V^{EXTERNAL}_{3i+1}\}_{i=0}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor} \\
 &\mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating\ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{Extreme\ Cardinality} 3z^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor}.
 \end{aligned}$$

*Proof.* Let

1472

$$\begin{aligned}
 &P : \\
 &V_2^{EXTERNAL}, E_2, \\
 &V_3^{EXTERNAL}, E_3, \\
 &\dots, \\
 &E_{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor - 1}, V^{EXTERNAL}_{\lfloor \frac{|E_{ESHG:(V,E)}|_{Extreme\ Cardinality}}{3} \rfloor}
 \end{aligned}$$

be a longest path taken from a connected Extreme SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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1474

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. ■

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136EXM19a

**Example 11.0.4.** In the Figure (30.2), the connected Extreme SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Extreme SuperHyperSet, in the Extreme SuperHyperModel (30.2), is the Extreme SuperHyperDominating.

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**Proposition 11.0.5.** Assume a connected Extreme SuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating} = \{E_i \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating\ SuperHyperPolynomial} \\
 &= |i \mid E_i \in |E_{ESHG:(V,E)}|_{Extreme\ Cardinality}|z. \\
 &\mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating\ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

1481

$$P : V_i^{EXTERNAL}, E_i, CENTER, E_j.$$

be a longest path taken a connected Extreme SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

1482  
1483

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

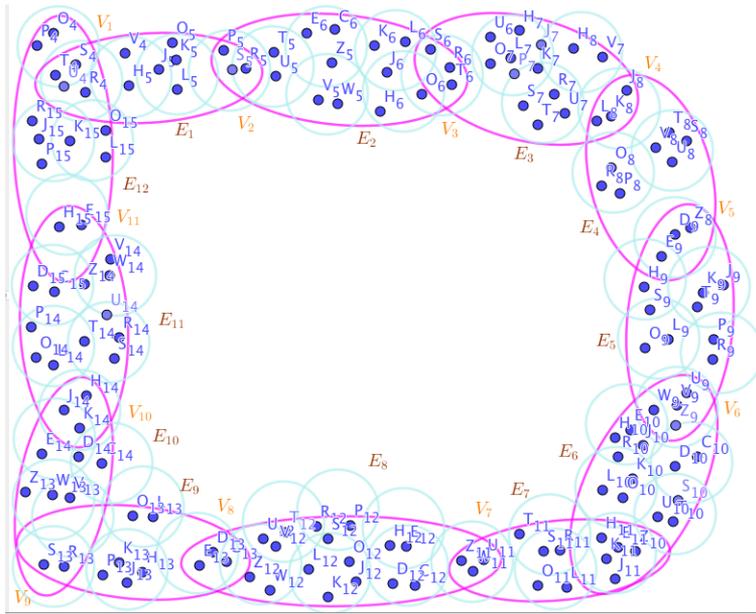


Figure 11.2: a Extreme SuperHyperCycle Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.7)

136NSHG19a

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. ■

136EXM20a

**Example 11.0.6.** In the Figure (30.3), the connected Extreme SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Extreme SuperHyperSet, by the Algorithm in previous Extreme result, of the Extreme SuperHyperVertices of the connected Extreme SuperHyperStar  $ESHS : (V, E)$ , in the Extreme SuperHyperModel (30.3), is the Extreme SuperHyperDominating.

**Proposition 11.0.7.** Assume a connected Extreme SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating\ SuperHyperPolynomial} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \end{aligned}$$

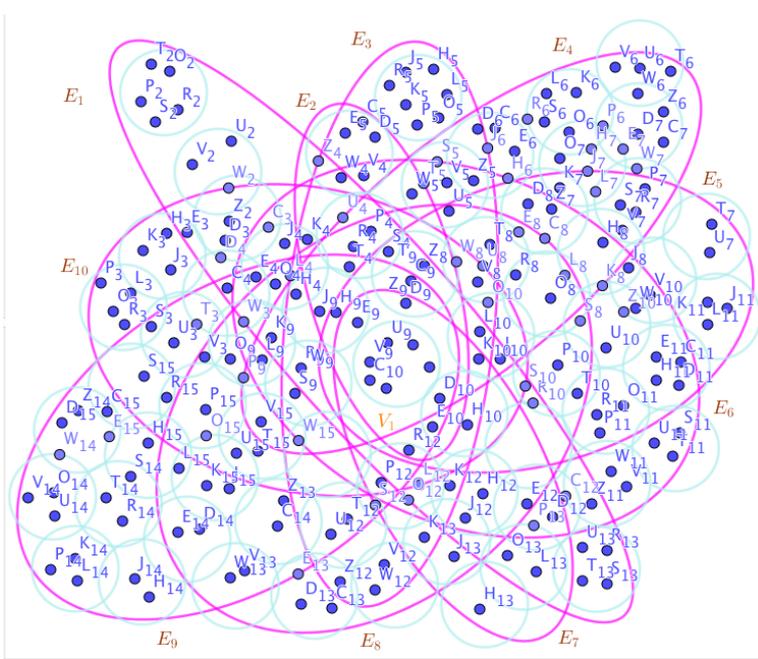


Figure 11.3: a Extreme SuperHyperStar Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.9)

136NSHG20a

$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{Extreme } V\text{-SuperHyperDominating SuperHyperPolynomial}} \\ &= \sum_{\substack{|V_i^{\text{EXTERNAL}}| \\ |ESHG:(V,E)|}}^{\text{Extreme Cardinality}} = \left( \sum_{i=|PESHG:(V,E)|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let 1492

$$\begin{aligned} P : \\ & V_1^{\text{EXTERNAL}}, E_1, \\ & V_2^{\text{EXTERNAL}}, E_2 \end{aligned}$$

is a longest path taken from a connected Extreme SuperHyperBipartite  $ESHB : (V, E)$ . There's 1493  
 a new way to redefine as 1494

$$\begin{aligned} & V_i^{\text{EXTERNAL}} \sim V_j^{\text{EXTERNAL}} \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}} \in E_z \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}}\} \subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{\text{EXTERNAL}})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 1495  
 $V_i^{\text{EXTERNAL}}$  in the literatures of SuperHyperDominating. The latter is straightforward. Then 1496  
 there's no at least one SuperHyperDominating. Thus the notion of quasi may be up but 1497

the SuperHyperNotions based on SuperHyperDominating could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperDominating taken from a connected Extreme SuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Extreme-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2,$$

The latter is straightforward. ■ 1504

136EXM21a

**Example 11.0.8.** In the Extreme Figure (30.4), the connected Extreme SuperHyperBipartite  $ESHB : (V, E)$ , is Extreme highlighted and Extreme featured. The obtained Extreme SuperHyperSet, by the Extreme Algorithm in previous Extreme result, of the Extreme SuperHyperVertices of the connected Extreme SuperHyperBipartite  $ESHB : (V, E)$ , in the Extreme SuperHyperModel (30.4), is the Extreme SuperHyperDominating.

**Proposition 11.0.9.** Assume a connected Extreme SuperHyperMultipartite  $ESHM : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating\ SuperHyperPolynomial} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating\ SuperHyperPolynomial} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{Extreme\ Cardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{ choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let

$$P : \\ V_1^{EXTERNAL}, E_1,$$



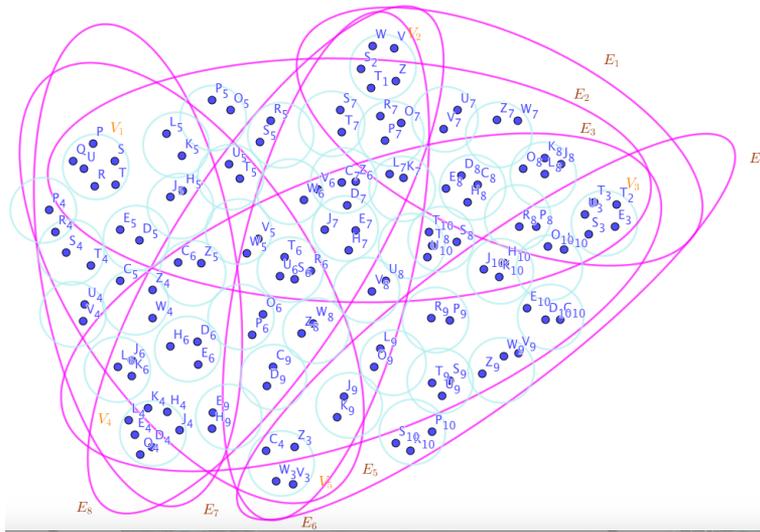


Figure 11.5: a Extreme SuperHyperMultipartite Associated to the Notions of Extreme SuperHyperDominating in the Example (41.0.13)

136NSHG22a

are attained in any solution

1522

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected Extreme SuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

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136EXM22a

**Example 11.0.10.** In the Figure (30.5), the connected Extreme SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Extreme featured. The obtained Extreme SuperHyperSet, by the Algorithm in previous Extreme result, of the Extreme SuperHyperVertices of the connected Extreme SuperHyperMultipartite  $ESHM : (V, E)$ , in the Extreme SuperHyperModel (30.5), is the Extreme SuperHyperDominating.

**Proposition 11.0.11.** Assume a connected Extreme SuperHyperWheel  $ESHW : (V, E)$ . Then,

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$$\begin{aligned} \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating} &= \{E_i \in E_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{Extreme\ SuperHyperDominating\ SuperHyperPolynomial} \\ &= |i \mid E_i \in |E^*_{ESHG:(V,E)}|_{Extreme\ Cardinality}|z. \\ \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{Extreme\ V-SuperHyperDominating\ SuperHyperPolynomial} &= z. \end{aligned}$$

*Proof.* Let

1531

$$P : V^{EXTERNAL}_i, E^*_i, CENTER, E_j.$$

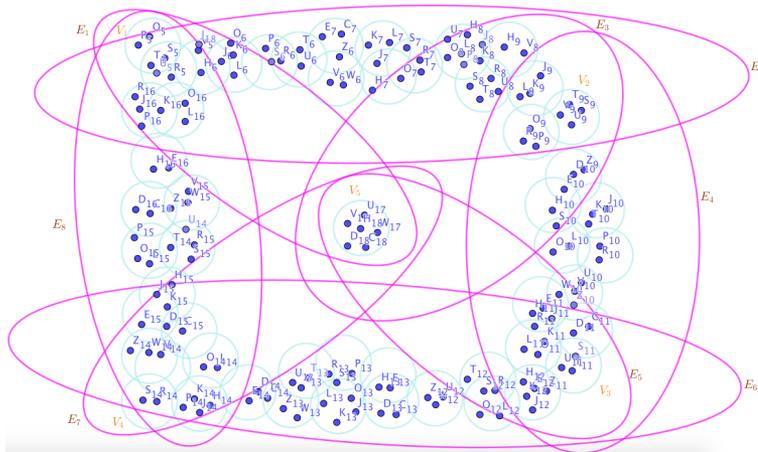


Figure 11.6: a Extreme SuperHyperWheel Extreme Associated to the Extreme Notions of Extreme SuperHyperDominating in the Extreme Example (41.0.15)

136NSHG23a

is a longest SuperHyperDominating taken from a connected Extreme SuperHyperWheel 1532  
*ESHW* : (V, E). There's a new way to redefine as 1533

$$\begin{aligned}
 V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded 1534  
 to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. 1535  
 Then there's at least one SuperHyperDominating. Thus the notion of quasi isn't up and the 1536  
 SuperHyperNotions based on SuperHyperDominating could be applied. The unique embedded 1537  
 SuperHyperDominating proposes some longest SuperHyperDominating excerpt from some 1538  
 representatives. The latter is straightforward. ■ 1539

136EXM23a

**Example 11.0.12.** In the Extreme Figure (30.6), the connected Extreme SuperHyperWheel 1540  
*NSHW* : (V, E), is Extreme highlighted and featured. The obtained Extreme SuperHyperSet, by 1541  
 the Algorithm in previous result, of the Extreme SuperHyperVertices of the connected Extreme 1542  
 SuperHyperWheel *ESHW* : (V, E), in the Extreme SuperHyperModel (30.6), is the Extreme 1543  
 SuperHyperDominating. 1544



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# The Surveys of Mathematical Sets On The Results But As The Initial Motivation

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For the SuperHyperDominating, Extreme SuperHyperDominating, and the Extreme SuperHyper-Dominating, some general results are introduced. 1548  
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*Remark 12.0.1.* Let remind that the Extreme SuperHyperDominating is “redefined” on the 1550  
positions of the alphabets. 1551

**Corollary 12.0.2.** *Assume Extreme SuperHyperDominating. Then* 1552

$$\begin{aligned} & \text{Extreme SuperHyperDominating} = \\ & \{ \text{the SuperHyperDominating of the SuperHyperVertices} \mid \\ & \max \{ \text{SuperHyperOffensive} \\ & \text{SuperHyperDominating} \\ & \mid \text{ExtremecardinalityamidthoseSuperHyperDominating.} \} \end{aligned}$$

plus one Extreme SuperHyperNeighbor to one. Where  $\sigma_i$  is the unary operation on the 1553  
SuperHyperVertices of the SuperHyperGraph to assign the determinacy, the indeterminacy and 1554  
the neutrality, for  $i = 1, 2, 3$ , respectively. 1555

**Corollary 12.0.3.** *Assume a Extreme SuperHyperGraph on the same identical letter of the alphabet. 1556  
Then the notion of Extreme SuperHyperDominating and SuperHyperDominating coincide.* 1557

**Corollary 12.0.4.** *Assume a Extreme SuperHyperGraph on the same identical letter of the alphabet. 1558  
Then a consecutive sequence of the SuperHyperVertices is a Extreme SuperHyperDominating if 1559  
and only if it's a SuperHyperDominating.* 1560

**Corollary 12.0.5.** *Assume a Extreme SuperHyperGraph on the same identical letter of the alphabet. 1561  
Then a consecutive sequence of the SuperHyperVertices is a strongest SuperHyperDominating if 1562  
and only if it's a longest SuperHyperDominating.* 1563

**Corollary 12.0.6.** *Assume SuperHyperClasses of a Extreme SuperHyperGraph on the same 1564  
identical letter of the alphabet. Then its Extreme SuperHyperDominating is its SuperHyper- 1565  
Dominating and reversely.* 1566

**Corollary 12.0.7.** *Assume a Extreme SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, 1567  
SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel) on the same identical letter 1568*

of the alphabet. Then its Extreme SuperHyperDominating is its SuperHyperDominating and  
reversely. 1569  
1570

**Corollary 12.0.8.** Assume a Extreme SuperHyperGraph. Then its Extreme SuperHyperDominat- 1571  
ing isn't well-defined if and only if its SuperHyperDominating isn't well-defined. 1572

**Corollary 12.0.9.** Assume SuperHyperClasses of a Extreme SuperHyperGraph. Then its Extreme 1573  
SuperHyperDominating isn't well-defined if and only if its SuperHyperDominating isn't well- 1574  
defined. 1575

**Corollary 12.0.10.** Assume a Extreme SuperHyperPath(-/SuperHyperDominating, SuperHyper- 1576  
Star, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). Then its Extreme Super- 1577  
HyperDominating isn't well-defined if and only if its SuperHyperDominating isn't well-defined. 1578

**Corollary 12.0.11.** Assume a Extreme SuperHyperGraph. Then its Extreme SuperHyperDomin- 1579  
ating is well-defined if and only if its SuperHyperDominating is well-defined. 1580

**Corollary 12.0.12.** Assume SuperHyperClasses of a Extreme SuperHyperGraph. Then its Extreme 1581  
SuperHyperDominating is well-defined if and only if its SuperHyperDominating is well-defined. 1582

**Corollary 12.0.13.** Assume a Extreme SuperHyperPath(-/SuperHyperDominating, SuperHyper- 1583  
Star, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). Then its Extreme Super- 1584  
HyperDominating is well-defined if and only if its SuperHyperDominating is well-defined. 1585

**Proposition 12.0.14.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph. Then  $V$  is 1586

(i) : the dual SuperHyperDefensive SuperHyperDominating; 1587

(ii) : the strong dual SuperHyperDefensive SuperHyperDominating; 1588

(iii) : the connected dual SuperHyperDefensive SuperHyperDominating; 1589

(iv) : the  $\delta$ -dual SuperHyperDefensive SuperHyperDominating; 1590

(v) : the strong  $\delta$ -dual SuperHyperDefensive SuperHyperDominating; 1591

(vi) : the connected  $\delta$ -dual SuperHyperDefensive SuperHyperDominating. 1592

**Proposition 12.0.15.** Let  $NTG : (V, E, \sigma, \mu)$  be a Extreme SuperHyperGraph. Then  $\emptyset$  is 1593

(i) : the SuperHyperDefensive SuperHyperDominating; 1594

(ii) : the strong SuperHyperDefensive SuperHyperDominating; 1595

(iii) : the connected defensive SuperHyperDefensive SuperHyperDominating; 1596

(iv) : the  $\delta$ -SuperHyperDefensive SuperHyperDominating; 1597

(v) : the strong  $\delta$ -SuperHyperDefensive SuperHyperDominating; 1598

(vi) : the connected  $\delta$ -SuperHyperDefensive SuperHyperDominating. 1599

**Proposition 12.0.16.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph. Then an independent 1600  
SuperHyperSet is 1601

- (i) : the SuperHyperDefensive SuperHyperDominating; 1602
- (ii) : the strong SuperHyperDefensive SuperHyperDominating; 1603
- (iii) : the connected SuperHyperDefensive SuperHyperDominating; 1604
- (iv) : the  $\delta$ -SuperHyperDefensive SuperHyperDominating; 1605
- (v) : the strong  $\delta$ -SuperHyperDefensive SuperHyperDominating; 1606
- (vi) : the connected  $\delta$ -SuperHyperDefensive SuperHyperDominating. 1607

**Proposition 12.0.17.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperUniform SuperHyperGraph which is a SuperHyperDominating/SuperHyperPath. Then  $V$  is a maximal 1608  
1609

- (i) : SuperHyperDefensive SuperHyperDominating; 1610
- (ii) : strong SuperHyperDefensive SuperHyperDominating; 1611
- (iii) : connected SuperHyperDefensive SuperHyperDominating; 1612
- (iv) :  $\mathcal{O}(ESHG)$ -SuperHyperDefensive SuperHyperDominating; 1613
- (v) : strong  $\mathcal{O}(ESHG)$ -SuperHyperDefensive SuperHyperDominating; 1614
- (vi) : connected  $\mathcal{O}(ESHG)$ -SuperHyperDefensive SuperHyperDominating; 1615

Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 1616

**Proposition 12.0.18.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph which is a SuperHyperUniform SuperHyperWheel. Then  $V$  is a maximal 1617  
1618

- (i) : dual SuperHyperDefensive SuperHyperDominating; 1619
- (ii) : strong dual SuperHyperDefensive SuperHyperDominating; 1620
- (iii) : connected dual SuperHyperDefensive SuperHyperDominating; 1621
- (iv) :  $\mathcal{O}(ESHG)$ -dual SuperHyperDefensive SuperHyperDominating; 1622
- (v) : strong  $\mathcal{O}(ESHG)$ -dual SuperHyperDefensive SuperHyperDominating; 1623
- (vi) : connected  $\mathcal{O}(ESHG)$ -dual SuperHyperDefensive SuperHyperDominating; 1624

Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 1625

**Proposition 12.0.19.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperUniform SuperHyperGraph which is a SuperHyperDominating/SuperHyperPath. Then the number of 1626  
1627

- (i) : the SuperHyperDominating; 1628
- (ii) : the SuperHyperDominating; 1629
- (iii) : the connected SuperHyperDominating; 1630
- (iv) : the  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 1631

(v) : the strong  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 1632

(vi) : the connected  $\mathcal{O}(ESHG)$ -SuperHyperDominating. 1633

is one and it's only  $V$ . Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 1634  
1635

**Proposition 12.0.20.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperUniform SuperHyperGraph which is a SuperHyperWheel. Then the number of 1636  
1637

(i) : the dual SuperHyperDominating; 1638

(ii) : the dual SuperHyperDominating; 1639

(iii) : the dual connected SuperHyperDominating; 1640

(iv) : the dual  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 1641

(v) : the strong dual  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 1642

(vi) : the connected dual  $\mathcal{O}(ESHG)$ -SuperHyperDominating. 1643

is one and it's only  $V$ . Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 1644  
1645

**Proposition 12.0.21.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperUniform SuperHyperGraph which is a SuperHyperStar/SuperHyperComplete SuperHyperBipartite/SuperHyperComplete SuperHyperMultipartite. Then a SuperHyperSet contains [the SuperHyperCenter and] the half of multiplying  $r$  with the number of all the SuperHyperEdges plus one of all the SuperHyperVertices is a 1646  
1647  
1648  
1649  
1650

(i) : dual SuperHyperDefensive SuperHyperDominating; 1651

(ii) : strong dual SuperHyperDefensive SuperHyperDominating; 1652

(iii) : connected dual SuperHyperDefensive SuperHyperDominating; 1653

(iv) :  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating; 1654

(v) : strong  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating; 1655

(vi) : connected  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating. 1656

**Proposition 12.0.22.** Let  $ESHG : (V, E)$  be a Extreme SuperHyperUniform SuperHyperGraph which is a SuperHyperStar/SuperHyperComplete SuperHyperBipartite/SuperHyperComplete SuperHyperMultipartite. Then a SuperHyperSet contains the half of multiplying  $r$  with the number of all the SuperHyperEdges plus one of all the SuperHyperVertices in the biggest SuperHyperPart is a 1657  
1658  
1659  
1660  
1661

(i) : SuperHyperDefensive SuperHyperDominating; 1662

(ii) : strong SuperHyperDefensive SuperHyperDominating; 1663

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 1664

(iv) :  *$\delta$ -SuperHyperDefensive SuperHyperDominating;* 1665

(v) : *strong  $\delta$ -SuperHyperDefensive SuperHyperDominating;* 1666

(vi) : *connected  $\delta$ -SuperHyperDefensive SuperHyperDominating.* 1667

**Proposition 12.0.23.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperUniform SuperHyperGraph which is a SuperHyperStar/SuperHyperComplete SuperHyperBipartite/SuperHyperComplete SuperHyperMultipartite. Then Then the number of* 1668  
1669  
1670

(i) : *dual SuperHyperDefensive SuperHyperDominating;* 1671

(ii) : *strong dual SuperHyperDefensive SuperHyperDominating;* 1672

(iii) : *connected dual SuperHyperDefensive SuperHyperDominating;* 1673

(iv) :  *$\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating;* 1674

(v) : *strong  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating;* 1675

(vi) : *connected  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating.* 1676

*is one and it's only  $S$ , a SuperHyperSet contains [the SuperHyperCenter and] the half of multiplying  $r$  with the number of all the SuperHyperEdges plus one of all the SuperHyperVertices. Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide.* 1677  
1678  
1679

**Proposition 12.0.24.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph. The number of connected component is  $|V - S|$  if there's a SuperHyperSet which is a dual* 1680  
1681

(i) : *SuperHyperDefensive SuperHyperDominating;* 1682

(ii) : *strong SuperHyperDefensive SuperHyperDominating;* 1683

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 1684

(iv) : *SuperHyperDominating;* 1685

(v) : *strong 1-SuperHyperDefensive SuperHyperDominating;* 1686

(vi) : *connected 1-SuperHyperDefensive SuperHyperDominating.* 1687

**Proposition 12.0.25.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph. Then the number is at most  $\mathcal{O}(ESHG)$  and the Extreme number is at most  $\mathcal{O}_n(ESHG)$ .* 1688  
1689

**Proposition 12.0.26.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph which is SuperHyperComplete. The number is  $\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1$  and the Extreme number is  $\min_{v \in \{v_1, v_2, \dots, v_t\}} \sum_{t > \frac{\mathcal{O}(ESHG:(V,E))}{2}} \subseteq V \sigma(v)$ , in the setting of dual* 1690  
1691  
1692

(i) : *SuperHyperDefensive SuperHyperDominating;* 1693

(ii) : *strong SuperHyperDefensive SuperHyperDominating;* 1694

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 1695

(iv) :  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating;* 1696

(v) : *strong*  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating;* 1697

(vi) : *connected*  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating.* 1698

**Proposition 12.0.27.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph which is  $\emptyset$ . The number 1699  
 is 0 and the Extreme number is 0, for an independent SuperHyperSet in the setting of dual 1700*

(i) : *SuperHyperDefensive SuperHyperDominating;* 1701

(ii) : *strong SuperHyperDefensive SuperHyperDominating;* 1702

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 1703

(iv) : *0-SuperHyperDefensive SuperHyperDominating;* 1704

(v) : *strong 0-SuperHyperDefensive SuperHyperDominating;* 1705

(vi) : *connected 0-SuperHyperDefensive SuperHyperDominating.* 1706

**Proposition 12.0.28.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph which is SuperHyper- 1707  
 Complete. Then there's no independent SuperHyperSet. 1708*

**Proposition 12.0.29.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph which is SuperHy- 1709  
 perDominating/SuperHyperPath/SuperHyperWheel. The number is  $\mathcal{O}(ESHG : (V, E))$  and the 1710  
 Extreme number is  $\mathcal{O}_n(ESHG : (V, E))$ , in the setting of a dual 1711*

(i) : *SuperHyperDefensive SuperHyperDominating;* 1712

(ii) : *strong SuperHyperDefensive SuperHyperDominating;* 1713

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 1714

(iv) :  $\mathcal{O}(ESHG : (V, E))$ -*SuperHyperDefensive SuperHyperDominating;* 1715

(v) : *strong*  $\mathcal{O}(ESHG : (V, E))$ -*SuperHyperDefensive SuperHyperDominating;* 1716

(vi) : *connected*  $\mathcal{O}(ESHG : (V, E))$ -*SuperHyperDefensive SuperHyperDominating.* 1717

**Proposition 12.0.30.** *Let  $ESHG : (V, E)$  be a Extreme SuperHyperGraph which is Super- 1718  
 HyperStar/complete SuperHyperBipartite/complete SuperHyperMultiPartite. The number is 1719  
 $\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1$  and the Extreme number is  $\min_{v \in \{v_1, v_2, \dots, v_t\}_{t > \frac{\mathcal{O}(ESHG:(V,E))}{2}}} \subseteq_V \sigma(v)$ , in the 1720  
 setting of a dual 1721*

(i) : *SuperHyperDefensive SuperHyperDominating;* 1722

(ii) : *strong SuperHyperDefensive SuperHyperDominating;* 1723

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 1724

(iv) :  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -SuperHyperDefensive SuperHyperDominating; 1725

(v) : strong  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -SuperHyperDefensive SuperHyperDominating; 1726

(vi) : connected  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -SuperHyperDefensive SuperHyperDominating. 1727

**Proposition 12.0.31.** Let  $\mathcal{NSHF} : (V, E)$  be a SuperHyperFamily of the ESHGs :  $(V, E)$  Extreme SuperHyperGraphs which are from one-type SuperHyperClass which the result is obtained for the individuals. Then the results also hold for the SuperHyperFamily  $\mathcal{NSHF} : (V, E)$  of these specific SuperHyperClasses of the Extreme SuperHyperGraphs. 1728  
1729  
1730  
1731

**Proposition 12.0.32.** Let  $ESHG : (V, E)$  be a strong Extreme SuperHyperGraph. If  $S$  is a dual SuperHyperDefensive SuperHyperDominating, then  $\forall v \in V \setminus S, \exists x \in S$  such that 1732  
1733

(i)  $v \in N_s(x)$ ; 1734

(ii)  $vx \in E$ . 1735

**Proposition 12.0.33.** Let  $ESHG : (V, E)$  be a strong Extreme SuperHyperGraph. If  $S$  is a dual SuperHyperDefensive SuperHyperDominating, then 1736  
1737

(i)  $S$  is SuperHyperDominating set; 1738

(ii) there's  $S \subseteq S'$  such that  $|S'|$  is SuperHyperChromatic number. 1739

**Proposition 12.0.34.** Let  $ESHG : (V, E)$  be a strong Extreme SuperHyperGraph. Then 1740

(i)  $\Gamma \leq \mathcal{O}$ ; 1741

(ii)  $\Gamma_s \leq \mathcal{O}_n$ . 1742

**Proposition 12.0.35.** Let  $ESHG : (V, E)$  be a strong Extreme SuperHyperGraph which is connected. Then 1743  
1744

(i)  $\Gamma \leq \mathcal{O} - 1$ ; 1745

(ii)  $\Gamma_s \leq \mathcal{O}_n - \sum_{i=1}^3 \sigma_i(x)$ . 1746

**Proposition 12.0.36.** Let  $ESHG : (V, E)$  be an odd SuperHyperPath. Then 1747

(i) the SuperHyperSet  $S = \{v_2, v_4, \dots, v_{n-1}\}$  is a dual SuperHyperDefensive SuperHyperDominating; 1748  
1749

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$  and corresponded SuperHyperSet is  $S = \{v_2, v_4, \dots, v_{n-1}\}$ ; 1750

(iii)  $\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s)\}$ ; 1751

(iv) the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_{n-1}\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only a dual SuperHyperDominating. 1752  
1753

**Proposition 12.0.37.** Let  $ESHG : (V, E)$  be an even SuperHyperPath. Then 1754

(i) the set  $S = \{v_2, v_4, \dots, v_n\}$  is a dual SuperHyperDefensive SuperHyperDominating; 1755

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor$  and corresponded SuperHyperSets are  $\{v_2, v_4, \dots, v_n\}$  and  $\{v_1, v_3, \dots, v_{n-1}\}$ ; 1756

(iii)  $\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_n\}} \sum_{i=1}^3 \sigma_i(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s)\}$ ; 1757

(iv) the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_n\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only dual SuperHyperDominating. 1758  
1759

**Proposition 12.0.38.** Let  $ESHG : (V, E)$  be an even SuperHyperDominating. Then 1760

(i) the SuperHyperSet  $S = \{v_2, v_4, \dots, v_n\}$  is a dual SuperHyperDefensive SuperHyperDominating; 1761  
1762

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor$  and corresponded SuperHyperSets are  $\{v_2, v_4, \dots, v_n\}$  and  $\{v_1, v_3, \dots, v_{n-1}\}$ ; 1763

(iii)  $\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_n\}} \sigma(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sigma(s)\}$ ; 1764

(iv) the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_n\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only dual SuperHyperDominating. 1765  
1766

**Proposition 12.0.39.** Let  $ESHG : (V, E)$  be an odd SuperHyperDominating. Then 1767

(i) the SuperHyperSet  $S = \{v_2, v_4, \dots, v_{n-1}\}$  is a dual SuperHyperDefensive SuperHyperDominating; 1768  
1769

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$  and corresponded SuperHyperSet is  $S = \{v_2, v_4, \dots, v_{n-1}\}$ ; 1770

(iii)  $\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s)\}$ ; 1771

(iv) the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_{n-1}\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only dual SuperHyperDominating. 1772  
1773

**Proposition 12.0.40.** Let  $ESHG : (V, E)$  be SuperHyperStar. Then 1774

(i) the SuperHyperSet  $S = \{c\}$  is a dual maximal SuperHyperDominating; 1775

(ii)  $\Gamma = 1$ ; 1776

(iii)  $\Gamma_s = \sum_{i=1}^3 \sigma_i(c)$ ; 1777

(iv) the SuperHyperSets  $S = \{c\}$  and  $S \subset S'$  are only dual SuperHyperDominating. 1778

**Proposition 12.0.41.** Let  $ESHG : (V, E)$  be SuperHyperWheel. Then 1779

(i) the SuperHyperSet  $S = \{v_1, v_3\} \cup \{v_6, v_9 \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}$  is a dual maximal SuperHyperDefensive SuperHyperDominating; 1780  
1781

(ii)  $\Gamma = |\{v_1, v_3\} \cup \{v_6, v_9 \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}|$ ; 1782

(iii)  $\Gamma_s = \sum_{\{v_1, v_3\} \cup \{v_6, v_9 \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}} \sum_{i=1}^3 \sigma_i(s)$ ; 1783

(iv) the SuperHyperSet  $\{v_1, v_3\} \cup \{v_6, v_9 \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}$  is only a dual maximal SuperHyperDefensive SuperHyperDominating. 1784  
1785

**Proposition 12.0.42.** Let  $ESHG : (V, E)$  be an odd SuperHyperComplete. Then 1786

- (i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  is a dual SuperHyperDefensive SuperHyperDominating; 1787
- (ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$ ; 1788
- (iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}}$ ; 1789
- (iv) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  is only a dual SuperHyperDefensive SuperHyperDominating. 1790  
1791

**Proposition 12.0.43.** Let  $ESHG : (V, E)$  be an even SuperHyperComplete. Then 1792

- (i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  is a dual SuperHyperDefensive SuperHyperDominating; 1793
- (ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor$ ; 1794
- (iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}}$ ; 1795
- (iv) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  is only a dual maximal SuperHyperDefensive SuperHyperDominating. 1796  
1797

**Proposition 12.0.44.** Let  $\mathcal{NSHF} : (V, E)$  be a  $m$ -SuperHyperFamily of Extreme SuperHyperStars with common Extreme SuperHyperVertex SuperHyperSet. Then 1798  
1799

- (i) the SuperHyperSet  $S = \{c_1, c_2, \dots, c_m\}$  is a dual SuperHyperDefensive SuperHyperDominating for  $\mathcal{NSHF}$ ; 1800  
1801
- (ii)  $\Gamma = m$  for  $\mathcal{NSHF} : (V, E)$ ; 1802
- (iii)  $\Gamma_s = \sum_{i=1}^m \sum_{j=1}^3 \sigma_j(c_i)$  for  $\mathcal{NSHF} : (V, E)$ ; 1803
- (iv) the SuperHyperSets  $S = \{c_1, c_2, \dots, c_m\}$  and  $S \subset S'$  are only dual SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ . 1804  
1805

**Proposition 12.0.45.** Let  $\mathcal{NSHF} : (V, E)$  be an  $m$ -SuperHyperFamily of odd SuperHyperComplete SuperHyperGraphs with common Extreme SuperHyperVertex SuperHyperSet. Then 1806  
1807

- (i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  is a dual maximal SuperHyperDefensive SuperHyperDominating for  $\mathcal{NSHF}$ ; 1808  
1809
- (ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$  for  $\mathcal{NSHF} : (V, E)$ ; 1810
- (iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}}$  for  $\mathcal{NSHF} : (V, E)$ ; 1811
- (iv) the SuperHyperSets  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  are only a dual maximal SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ . 1812  
1813

**Proposition 12.0.46.** Let  $\mathcal{NSHF} : (V, E)$  be a  $m$ -SuperHyperFamily of even SuperHyperComplete SuperHyperGraphs with common Extreme SuperHyperVertex SuperHyperSet. Then 1814  
1815

- (i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  is a dual SuperHyperDefensive SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ ; 1816  
1817

- (ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor$  for  $\mathcal{NSHF} : (V, E)$ ; 1818
- (iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}}$  for  $\mathcal{NSHF} : (V, E)$ ; 1819
- (iv) the SuperHyperSets  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  are only dual maximal SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ . 1820  
1821

**Proposition 12.0.47.** Let  $ESHG : (V, E)$  be a strong Extreme SuperHyperGraph. Then following statements hold; 1822  
1823

- (i) if  $s \geq t$  and a SuperHyperSet  $S$  of SuperHyperVertices is an  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is an  $s$ -SuperHyperDefensive SuperHyperDominating; 1824  
1825
- (ii) if  $s \leq t$  and a SuperHyperSet  $S$  of SuperHyperVertices is a dual  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is a dual  $s$ -SuperHyperDefensive SuperHyperDominating. 1826  
1827

**Proposition 12.0.48.** Let  $ESHG : (V, E)$  be a strong Extreme SuperHyperGraph. Then following statements hold; 1828  
1829

- (i) if  $s \geq t + 2$  and a SuperHyperSet  $S$  of SuperHyperVertices is an  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is an  $s$ -SuperHyperPowerful SuperHyperDominating; 1830  
1831
- (ii) if  $s \leq t$  and a SuperHyperSet  $S$  of SuperHyperVertices is a dual  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is a dual  $s$ -SuperHyperPowerful SuperHyperDominating. 1832  
1833

**Proposition 12.0.49.** Let  $ESHG : (V, E)$  be a  $[an]$   $[V-]$ SuperHyperUniform-strong-Extreme SuperHyperGraph. Then following statements hold; 1834  
1835

- (i) if  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{r}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1836  
1837
- (ii) if  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{r}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 1838  
1839
- (iii) if  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is an  $V$ -SuperHyperDefensive SuperHyperDominating; 1840  
1841
- (iv) if  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is a dual  $V$ -SuperHyperDefensive SuperHyperDominating. 1842  
1843

**Proposition 12.0.50.** Let  $ESHG : (V, E)$  is a  $[an]$   $[V-]$ SuperHyperUniform-strong-Extreme SuperHyperGraph. Then following statements hold; 1844  
1845

- (i)  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{r}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1846  
1847
- (ii)  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{r}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 1848  
1849
- (iii)  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is an  $V$ -SuperHyperDefensive SuperHyperDominating; 1850  
1851

(iv)  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is a dual  $V$ -SuperHyperDefensive SuperHyperDominating. 1852  
1853

**Proposition 12.0.51.** Let  $ESHG : (V, E)$  is a[an]  $[V]$ -SuperHyperUniform-strong-Extreme SuperHyperGraph which is a SuperHyperComplete. Then following statements hold; 1854  
1855

(i)  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1856  
1857

(ii)  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 1858  
1859

(iii)  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is an  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating; 1860  
1861

(iv)  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is a dual  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating. 1862  
1863

**Proposition 12.0.52.** Let  $ESHG : (V, E)$  is a[an]  $[V]$ -SuperHyperUniform-strong-Extreme SuperHyperGraph which is a SuperHyperComplete. Then following statements hold; 1864  
1865

(i) if  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1866  
1867

(ii) if  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 1868  
1869

(iii) if  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating; 1870  
1871

(iv) if  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is a dual  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating. 1872  
1873

**Proposition 12.0.53.** Let  $ESHG : (V, E)$  is a[an]  $[V]$ -SuperHyperUniform-strong-Extreme SuperHyperGraph which is SuperHyperDominating. Then following statements hold; 1874  
1875

(i)  $\forall a \in S, |N_s(a) \cap S| < 2$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1876  
1877

(ii)  $\forall a \in V \setminus S, |N_s(a) \cap S| > 2$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 1878  
1879

(iii)  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1880  
1881

(iv)  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating. 1882  
1883

**Proposition 12.0.54.** Let  $ESHG : (V, E)$  is a[an]  $[V]$ -SuperHyperUniform-strong-Extreme SuperHyperGraph which is SuperHyperDominating. Then following statements hold; 1884  
1885

(i) if  $\forall a \in S, |N_s(a) \cap S| < 2$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1886  
1887

- (ii) if  $\forall a \in V \setminus S$ ,  $|N_s(a) \cap S| > 2$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 1888  
1889
- (iii) if  $\forall a \in S$ ,  $|N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 1890  
1891
- (iv) if  $\forall a \in V \setminus S$ ,  $|N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating. 1892  
1893

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## Extreme Applications in Cancer's Extreme Recognition

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1896

The cancer is the Extreme disease but the Extreme model is going to figure out what's going on this Extreme phenomenon. The special Extreme case of this Extreme disease is considered and as the consequences of the model, some parameters are used. The cells are under attack of this disease but the moves of the cancer in the special region are the matter of mind. The Extreme recognition of the cancer could help to find some Extreme treatments for this Extreme disease. In the following, some Extreme steps are Extreme devised on this disease.

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**Step 1. (Extreme Definition)** The Extreme recognition of the cancer in the long-term Extreme function.

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**Step 2. (Extreme Issue)** The specific region has been assigned by the Extreme model [it's called Extreme SuperHyperGraph] and the long Extreme cycle of the move from the cancer is identified by this research. Sometimes the move of the cancer hasn't be easily identified since there are some determinacy, indeterminacy and neutrality about the moves and the effects of the cancer on that region; this event leads us to choose another model [it's said to be Extreme SuperHyperGraph] to have convenient perception on what's happened and what's done.

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**Step 3. (Extreme Model)** There are some specific Extreme models, which are well-known and they've got the names, and some general Extreme models. The moves and the Extreme traces of the cancer on the complex tracks and between complicated groups of cells could be fantasized by a Extreme SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). The aim is to find either the Extreme SuperHyperDominating or the Extreme SuperHyperDominating in those Extreme Extreme SuperHyperModels.

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Table 14.1: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges  
Belong to The Extreme SuperHyperBipartite

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBLaa21aa

of the Extreme SuperHyperVertices of the connected Extreme SuperHyperBipartite  $ESHB$  : 1928  
( $V, E$ ), in the Extreme SuperHyperModel (33.1), is the Extreme SuperHyperDominating. 1929

**Case 2: The Increasing Extreme Steps  
Toward Extreme  
SuperHyperMultipartite as Extreme  
SuperHyperModel**

1931

1932

1933

1934

**Step 4. (Extreme Solution)** In the Extreme Figure (34.1), the Extreme SuperHyperMultipartite is Extreme highlighted and Extreme featured.

1935

1936

By using the Extreme Figure (34.1) and the Table (34.1), the Extreme SuperHyperMultipartite is obtained.

1937

1938

The obtained Extreme SuperHyperSet, by the Extreme Algorithm in previous result,

1939

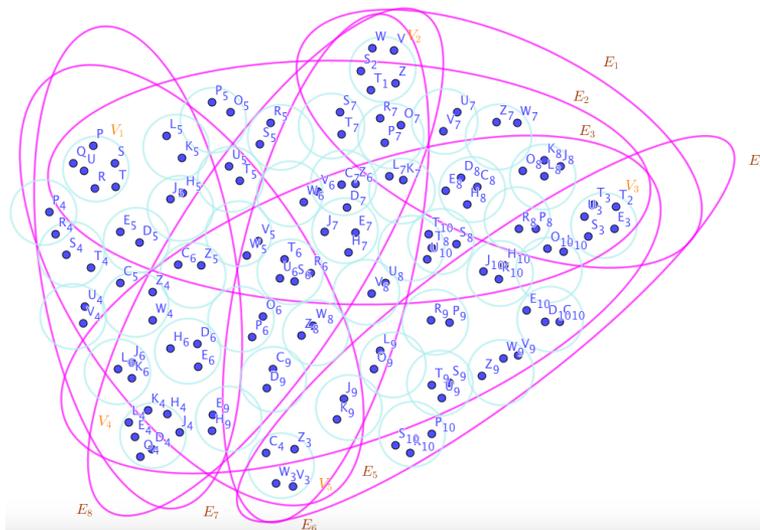


Figure 15.1: a Extreme SuperHyperMultipartite Associated to the Notions of Extreme SuperHyperDominating

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Table 15.1: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges  
 Belong to The Extreme SuperHyperMultipartite

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBLaa22aa

of the Extreme SuperHyperVertices of the connected Extreme SuperHyperMultipartite <sup>1940</sup>  
 $ESHM : (V, E)$ , in the Extreme SuperHyperModel (34.1), is the Extreme SuperHyper- <sup>1941</sup>  
 Dominating. <sup>1942</sup>

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## Wondering Open Problems But As The Directions To Forming The Motivations

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1944

1945

In what follows, some “problems” and some “questions” are proposed.

1946

The SuperHyperDominating and the Extreme SuperHyperDominating are defined on a real-world application, titled “Cancer’s Recognitions”.

1947

1948

**Question 16.0.1.** *Which the else SuperHyperModels could be defined based on Cancer’s recognitions?*

1949

1950

**Question 16.0.2.** *Are there some SuperHyperNotions related to SuperHyperDominating and the Extreme SuperHyperDominating?*

1951

1952

**Question 16.0.3.** *Are there some Algorithms to be defined on the SuperHyperModels to compute them?*

1953

1954

**Question 16.0.4.** *Which the SuperHyperNotions are related to beyond the SuperHyperDominating and the Extreme SuperHyperDominating?*

1955

1956

**Problem 16.0.5.** *The SuperHyperDominating and the Extreme SuperHyperDominating do a SuperHyperModel for the Cancer’s recognitions and they’re based on SuperHyperDominating, are there else?*

1957

1958

1959

**Problem 16.0.6.** *Which the fundamental SuperHyperNumbers are related to these SuperHyperNumbers types-results?*

1960

1961

**Problem 16.0.7.** *What’s the independent research based on Cancer’s recognitions concerning the multiple types of SuperHyperNotions?*

1962

1963



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## Conclusion and Closing Remarks

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In this section, concluding remarks and closing remarks are represented. The drawbacks of this research are illustrated. Some benefits and some advantages of this research are highlighted. This research uses some approaches to make Extreme SuperHyperGraphs more understandable. In this endeavor, two SuperHyperNotions are defined on the SuperHyperDominating. For that sake in the second definition, the main definition of the Extreme SuperHyperGraph is redefined on the position of the alphabets. Based on the new definition for the Extreme SuperHyperGraph, the new SuperHyperNotion, Extreme SuperHyperDominating, finds the convenient background to implement some results based on that. Some SuperHyperClasses and some Extreme SuperHyperClasses are the cases of this research on the modeling of the regions where are under the attacks of the cancer to recognize this disease as it's mentioned on the title "Cancer's Recognitions". To formalize the instances on the SuperHyperNotion, SuperHyperDominating, the new SuperHyperClasses and SuperHyperClasses, are introduced. Some general results are gathered in the section on the SuperHyperDominating and the Extreme SuperHyperDominating. The clarifications, instances and literature reviews have taken the whole way through. In this research, the literature reviews have fulfilled the lines containing the notions and the results. The SuperHyperGraph and Extreme SuperHyperGraph are the SuperHyperModels on the "Cancer's Recognitions" and both bases are the background of this research. Sometimes the cancer has been happened on the region, full of cells, groups of cells and embedded styles. In this segment, the SuperHyperModel proposes some SuperHyperNotions based on the connectivities of the moves of the cancer in the longest and strongest styles with the formation of the design and the architecture are formally called " SuperHyperDominating" in the themes of jargons and buzzwords. The prefix "SuperHyper" refers to the theme of the embedded styles to figure out the background for the SuperHyperNotions. In the Table (36.1), benefits and avenues for this research are, figured out, pointed out and spoken out.

Table 17.1: An Overlook On This Research And Beyond

136TBLTBL

Advantages	Limitations
1. Redefining Extreme SuperHyperGraph	1. General Results
2. SuperHyperDominating	
3. Extreme SuperHyperDominating	2. Other SuperHyperNumbers
4. Modeling of Cancer's Recognitions	
5. SuperHyperClasses	3. SuperHyperFamilies

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# ExtremeSuperHyperDuality But As The Extensions Excerpt From Dense And Super Forms

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**Definition 18.0.1.** (Different ExtremeTypes of ExtremeSuperHyperDuality). 1994  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 1995  
 ExtremeSuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  1996  
 is called 1997

(i) **Extremee-SuperHyperDuality** if  $\forall E_i \in E', \exists E_j \in E_{ESHG:(V,E)} \setminus E'$  such that 1998  
 $V_a \in E_i, E_j$ ; 1999

(ii) **Extremere-SuperHyperDuality** if  $\forall E_i \in E', \exists E_j \in E_{ESHG:(V,E)} \setminus E'$  such that 2000  
 $V_a \in E_i, E_j$  and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2001

(iii) **Extremev-SuperHyperDuality** if  $\forall V_i \in V', \exists V_j \in V_{ESHG:(V,E)} \setminus V'$  such that 2002  
 $V_i, V_j \in E_a$ ; 2003

(iv) **Extremerv-SuperHyperDuality** if  $\forall V_i \in V', \exists V_j \in V_{ESHG:(V,E)} \setminus V'$  such that 2004  
 $V_i, V_j \in E_a$  and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2005

(v) **ExtremeSuperHyperDuality** if it's either of Extremee-SuperHyperDuality, Extremere- 2006  
 SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality. 2007

**Definition 18.0.2.** ((Neutrosophic) SuperHyperDuality). 2008  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2009  
 ExtremeSuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 2010

(i) an **Extreme SuperHyperDuality** if it's either of Extremee-SuperHyperDuality, 2011  
 Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality 2012  
 and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme 2013  
 cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme 2014  
 SuperHyperEdges in the consecutive Extreme sequence of Extreme SuperHyperEdges and 2015  
 Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality; 2016

- (ii) a **ExtremeSuperHyperDuality** if it's either of Extremee-SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for a ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperDuality;
- (iii) an **Extreme SuperHyperDuality SuperHyperPolynomial** if it's either of Extremee-SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality; and the Extreme power is corresponded to its Extreme coefficient;
- (iv) a **ExtremeSuperHyperDuality SuperHyperPolynomial** if it's either of Extremee-SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperDuality; and the Extremepower is corresponded to its Extremecoefficient;
- (v) an **Extreme R-SuperHyperDuality** if it's either of Extremee-SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality;
- (vi) a **ExtremeR-SuperHyperDuality** if it's either of Extremee-SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperDuality;
- (vii) an **Extreme R-SuperHyperDuality SuperHyperPolynomial** if it's either of Extremee-SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality; and the Extreme power is corresponded to its Extreme coefficient;

(viii) a **ExtremeSuperHyperDuality SuperHyperPolynomial** if it's either of Extreme-  
 SuperHyperDuality, Extremere-SuperHyperDuality, Extremev-SuperHyperDuality, and  
 Extremerv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG$  :  
 $(V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the  
 Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperVertices  
 of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyper-  
 HyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyper-  
 Duality; and the Extremepower is corresponded to its Extremecoefficient.

**Example 18.0.3.** Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$   
 in the mentioned ExtremeFigures in every Extremeitems.

- On the Figure (29.1), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality,  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward.  $E_1$  and  $E_3$  are some  
 empty Extreme SuperHyperEdges but  $E_2$  is a loop ExtremeSuperHyperEdge and  $E_4$   
 is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor,  
 there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  
 $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an  
 Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is** excluded in every given  
 ExtremeSuperHyperDuality.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.2), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality,  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward.  $E_1, E_2$  and  $E_3$  are some  
 empty ExtremeSuperHyperEdges but  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms  
 of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ .  
 The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuper-  
 rHyperEdge has it as an Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is**  
 excluded in every given ExtremeSuperHyperDuality.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.3), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality,  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.4), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2087  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2088

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2089  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2090

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2091  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2092

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_{3i+1^3_{i=0}}, E_{3i+24^3_{i=0}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 6z^8. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_{3i+1^7_{i=0}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 6z^8.\end{aligned}$$

- On the Figure (29.7), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2093  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2094

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_{15}, E_{16}, E_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.8), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2095  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2096

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.9), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2097  
2098

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_{3i+1}_{i=0}, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_{3i+1}_{i=0}, V_{15}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 3z^5.\end{aligned}$$

- On the Figure (29.10), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2099  
2100

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.11), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2101  
2102

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_6, V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 3 \times 3z^2.\end{aligned}$$

- On the Figure (29.12), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2103  
2104

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_{i=4}^{i \neq 5, 7, 8}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 5z^5.\end{aligned}$$

- On the Figure (29.13), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2105  
2106

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_5, E_9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 3 \times 3z^2.\end{aligned}$$

- On the Figure (29.14), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2107  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2108

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.15), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2109  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2110

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.16), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2111  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2112

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= \\ &(2 \times 1 \times 2) + (2 \times 4 \times 5)z.\end{aligned}$$

- On the Figure (29.17), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2113  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2114

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= \\ &(1 \times 1 \times 2)z.\end{aligned}$$

- On the Figure (29.18), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, 2115  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2116

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= \\ &(2 \times 2 \times 2)z.\end{aligned}$$

- On the Figure (29.19), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2117  
2118

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 3z^4. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_{2i+1_{i=0^5}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 2z^6.\end{aligned}$$

- On the Figure (29.20), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2119  
2120

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.21), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2121  
2122

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 10z.\end{aligned}$$

- On the Figure (29.22), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperDuality, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2123  
2124

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality}} &= \{E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperDuality SuperHyperPolynomial}} &= 4z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality}} &= \{V_3, V_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperDuality SuperHyperPolynomial}} &= 10 \times 9 + 10 \times 6 + 12 \times 9 + 12 \times 6z^2.\end{aligned}$$

The previous Extremeapproach apply on the upcoming Extremeresults on ExtremeSuperHyperClasses. 2125  
2126

**Proposition 18.0.4.** Assume a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperDuality} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperDuality} \text{ SuperHyperPolynomial} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperDuality} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperDuality} \text{ SuperHyperPolynomial} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

2128

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . There's a new way to redefine as

2129  
2130

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. ■

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2132

136EXM18a

**Example 18.0.5.** In the Figure (30.1), the connected ExtremeSuperHyperPath  $ESHP : (V, E)$ , is highlighted and featured. The ExtremeSuperHyperSet, in the ExtremeSuperHyperModel (30.1), is the SuperHyperDuality.

2133  
2134  
2135

**Proposition 18.0.6.** Assume a connected ExtremeSuperHyperCycle  $ESHC : (V, E)$ . Then

2136

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperDuality} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperDuality} \text{ SuperHyperPolynomial} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperDuality}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}} \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperDuality SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} \approx \frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V^{EXTERNAL}_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. ■

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136EXM19a

**Example 18.0.7.** In the Figure (30.2), the connected ExtremeSuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained ExtremeSuperHyperSet, in the ExtremeSuperHyper-Model (30.2), is the Extreme SuperHyperDuality.

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**Proposition 18.0.8.** Assume a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperDuality} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperDuality SuperHyperPolynomial} \\
 &= |i \mid E_i \in E_{ESHG:(V,E)}|_{ExtremeCardinality} |z|. \\
 &\mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperDuality} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperDuality SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

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$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

be a longest path taken a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. ■

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**Example 18.0.9.** In the Figure (30.3), the connected ExtremeSuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperStar  $ESHS : (V, E)$ , in the ExtremeSuperHyperModel (30.3), is the ExtremeSuperHyperDuality.

**Proposition 18.0.10.** Assume a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality}} \\
 &= \{E_i \in E_{P_i^{ESHG:(V,E)}}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality SuperHyperPolynomial}} \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 & \quad z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, V_j^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality SuperHyperPolynomial}} \\
 &= \sum_{|V_{P_i^{ESHG:(V,E)}}^{EXTERNAL}|_{\text{ExtremeCardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. Then there's at least one SuperHyperDuality. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperDuality could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

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$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2,
 \end{aligned}$$

$$\dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}$$

is a longest SuperHyperDuality taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}$$

The latter is straightforward. ■ 2167

136EXM21a

**Example 18.0.11.** In the ExtremeFigure (30.4), the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , is Extremehighlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the ExtremeAlgorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , in the ExtremeSuperHyperModel (30.4), is the Extreme SuperHyperDuality.

**Proposition 18.0.12.** Assume a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality}} \\ &= \{E_i \in E_{P_i^{ESHG:(V,E)}}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality SuperHyperPolynomial}} \\ &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\ & \quad z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality}} \\ &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperDuality SuperHyperPolynomial}} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{ExtremeCardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let 2175

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}$$

is a longest SuperHyperDuality taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

$$\begin{aligned} V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z. \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. Then there's at least one SuperHyperDuality. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperDuality could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}} \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}} \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

136EXM22a

**Example 18.0.13.** In the Figure (30.5), the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , in the ExtremeSuperHyperModel (30.5), is the ExtremeSuperHyperDuality.

**Proposition 18.0.14.** Assume a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . Then,

$$\begin{aligned} \mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperDuality} &= \{E^* \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperDuality SuperHyperPolynomial} \\ &= |i | E_i^* \in E_{ESHG:(V,E)}^*|_{ExtremeCardinality} |z|. \\ \mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperDuality} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperDuality SuperHyperPolynomial} &= z. \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 P : \\
 &V_1^{EXTERNAL}, E_1^*, \\
 &V_2^{EXTERNAL}, E_2^*, \\
 &\dots, \\
 &E_{|E_{ESHG:(V,E)}^*|^{ExtremeCardinality}}^*, V_{|E_{ESHG:(V,E)}^*|^{ExtremeCardinality}+1}^{EXTERNAL}
 \end{aligned}$$

is a longest SuperHyperDuality taken from a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z^* \in E_{ESHG:(V,E)}^*, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z^* \equiv \\
 &\exists! E_z^* \in E_{ESHG:(V,E)}^*, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z^*.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. Then there's at least one SuperHyperDuality. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperDuality could be applied. The unique embedded SuperHyperDuality proposes some longest SuperHyperDuality excerpt from some representatives. The latter is straightforward. ■

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136EXM23a

**Example 18.0.15.** In the ExtremeFigure (30.6), the connected ExtremeSuperHyperWheel  $NSHW : (V, E)$ , is Extremehighlighted and featured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous result, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ , in the ExtremeSuperHyperModel (30.6), is the ExtremeSuperHyperDuality.

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# ExtremeSuperHyperJoin But As The Extensions Excerpt From Dense And Super Forms

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**Definition 19.0.1.** (Different ExtremeTypes of ExtremeSuperHyperJoin). 2212  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2213  
 ExtremeSuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  2214  
 is called 2215

- (i) **Extremee-SuperHyperJoin** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that  $V_a \in E_i, E_j$ ; 2216  
 and  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; 2217
- (ii) **Extremere-SuperHyperJoin** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that  $V_a \in$  2218  
 $E_i, E_j$ ;  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  2219  
 $|E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2220
- (iii) **Extremev-SuperHyperJoin** if  $\forall V_i \in E_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; 2221  
 and  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; 2222
- (iv) **Extremerv-SuperHyperJoin** if  $\forall V_i \in E_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 2223  
 $V_i, V_j \in E_a$ ;  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  2224  
 $|V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2225
- (v) **ExtremeSuperHyperJoin** if it's either of Extremee-SuperHyperJoin, Extremere- 2226  
 SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin. 2227

**Definition 19.0.2.** ((Neutrosophic) SuperHyperJoin). 2228  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2229  
 ExtremeSuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 2230

- (i) an **Extreme SuperHyperJoin** if it's either of Extremee-SuperHyperJoin, Extremere- 2231  
 SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and 2232  
 $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme 2233  
 cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme 2234  
 SuperHyperEdges in the consecutive Extreme sequence of Extreme SuperHyperEdges and 2235  
 Extreme SuperHyperVertices such that they form the Extreme SuperHyperJoin; 2236

- (ii) a **ExtremeSuperHyperJoin** if it's either of Extremee-SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for a ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperJoin; 2237-2242
- (iii) an **Extreme SuperHyperJoin SuperHyperPolynomial** if it's either of Extremee-SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperJoin; and the Extreme power is corresponded to its Extreme coefficient; 2243-2250
- (iv) a **ExtremeSuperHyperJoin SuperHyperPolynomial** if it's either of Extremee-SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperJoin; and the Extremepower is corresponded to its Extremecoefficient; 2251-2258
- (v) an **Extreme R-SuperHyperJoin** if it's either of Extremee-SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperJoin; 2259-2264
- (vi) a **ExtremeR-SuperHyperJoin** if it's either of Extremee-SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperJoin; 2265-2270
- (vii) an **Extreme R-SuperHyperJoin SuperHyperPolynomial** if it's either of Extremee-SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperJoin; and the Extreme power is corresponded to its Extreme coefficient; 2271-2278

(viii) a **ExtremeSuperHyperJoin SuperHyperPolynomial** if it's either of Extreme-  
SuperHyperJoin, Extremere-SuperHyperJoin, Extremev-SuperHyperJoin, and Extremerv-  
SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is  
the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Ex-  
tremenumber of the maximum Extremecardinality of the ExtremeSuperHyperVertices of an  
ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges  
and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperJoin; and  
the Extremepower is corresponded to its Extremecoefficient.

136EXM1

**Example 19.0.3.** Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$   
in the mentioned ExtremeFigures in every Extremeitems.

- On the Figure (29.1), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin,  
is up. The ExtremeAlgorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some  
empty Extreme SuperHyperEdges but  $E_2$  is a loop ExtremeSuperHyperEdge and  $E_4$   
is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor,  
there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  
 $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an  
Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is** excluded in every given  
ExtremeSuperHyperJoin.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.2), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin,  
is up. The ExtremeAlgorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some  
empty ExtremeSuperHyperEdges but  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms  
of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ .  
The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuper-  
rHyperEdge has it as an Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is**  
excluded in every given ExtremeSuperHyperJoin.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.3), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is  
up. The ExtremeAlgorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is 2306  
 up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2307

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is 2308  
 up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2309

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is 2310  
 up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2311

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_{3i+1_{i=0}^3}, E_{3i+24_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 6z^8. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_{3i+1_{i=0}^7}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 6z^8.\end{aligned}$$

- On the Figure (29.7), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is 2312  
 up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2313

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_{15}, E_{16}, E_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= \\ &4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.8), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is 2314  
 up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2315

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= \\ &4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.9), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, is 2316  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2317

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_{3i+1}_{i=0}, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_{3i+1}_{i=0}, V_{15}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 3z^5.\end{aligned}$$

- On the Figure (29.10), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2318  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2319

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.11), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2320  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2321

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_6, V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= \\ 3 \times 3z^2.\end{aligned}$$

- On the Figure (29.12), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2322  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2323

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1, V_{i=4}^{i \neq 5,7,8}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 5z^5.\end{aligned}$$

- On the Figure (29.13), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2324  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2325

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_3, E_9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= \\ 3 \times 3z^2.\end{aligned}$$

- On the Figure (29.14), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2326  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2327

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} \text{ SuperHyperPolynomial} &= 2z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} \text{ SuperHyperPolynomial} &= z.\end{aligned}$$

- On the Figure (29.15), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2328  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2329

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} \text{ SuperHyperPolynomial} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} \text{ SuperHyperPolynomial} &= z.\end{aligned}$$

- On the Figure (29.16), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2330  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2331

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} \text{ SuperHyperPolynomial} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} \text{ SuperHyperPolynomial} &= \\ (1 \times 5 \times 5) + (1 \times 2 + 1)z^3.\end{aligned}$$

- On the Figure (29.17), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2332  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2333

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} \text{ SuperHyperPolynomial} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} \text{ SuperHyperPolynomial} &= \\ (1 \times 1 \times 2 + 1)z^4.\end{aligned}$$

- On the Figure (29.18), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2334  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2335

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} \text{ SuperHyperPolynomial} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} \text{ SuperHyperPolynomial} &= \\ (1 \times 1 \times 2 + 1)z^4.\end{aligned}$$

- On the Figure (29.19), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2336  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2337

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 3z^4. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_{2i+1_{i=0^5}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 2z^6. \end{aligned}$$

- On the Figure (29.20), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2338  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2339

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.21), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2340  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2341

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 10z. \end{aligned}$$

- On the Figure (29.22), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperJoin, 2342  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2343

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin}} &= \{V_3, V_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperJoin SuperHyperPolynomial}} &= 10 \times 6 + 10 \times 6 + 12 \times 6 + 12 \times 6z^2. \end{aligned}$$

The previous Extremeapproach apply on the upcoming Extremeresults on ExtremeSuperHyperClasses. 2344  
 2345

**Proposition 19.0.4.** Assume a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperJoin} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperJoin} \text{ SuperHyperPolynomial} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperJoin} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperJoin} \text{ SuperHyperPolynomial} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

2347

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. ■

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136EXM18a

**Example 19.0.5.** In the Figure (30.1), the connected ExtremeSuperHyperPath  $ESHP : (V, E)$ , is highlighted and featured. The ExtremeSuperHyperSet, in the ExtremeSuperHyperModel (30.1), is the SuperHyperJoin.

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**Proposition 19.0.6.** Assume a connected ExtremeSuperHyperCycle  $ESHC : (V, E)$ . Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperJoin} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperJoin} \text{ SuperHyperPolynomial} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperJoin}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}} \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperJoin \ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} \approx \frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V^{EXTERNAL}_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. ■

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136EXM19a

**Example 19.0.7.** In the Figure (30.2), the connected ExtremeSuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained ExtremeSuperHyperSet, in the ExtremeSuperHyper-Model (30.2), is the Extreme SuperHyperJoin.

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**Proposition 19.0.8.** Assume a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperJoin} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperJoin \ SuperHyperPolynomial} \\
 &= |i \mid E_i \in E_{ESHG:(V,E)}|_{ExtremeCardinality} |z|. \\
 &\mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperJoin} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperJoin \ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

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$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

be a longest path taken a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. ■

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a new way to redefine as

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$$\begin{aligned}
 V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. Then there's no at least one SuperHyperJoin. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperJoin could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|, V_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|+1}^{EXTERNAL}}
 \end{aligned}$$

is a longest SuperHyperJoin taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|, V_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|+1}^{EXTERNAL}}
 \end{aligned}$$

The latter is straightforward.

■ 2386

136EXM21a

**Example 19.0.11.** In the ExtremeFigure (30.4), the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , is Extremehighlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the ExtremeAlgorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , in the ExtremeSuperHyperModel (30.4), is the Extreme SuperHyperJoin.

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**Proposition 19.0.12.** Assume a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperJoin} \\
 &= (PERFECT MATCHING). \\
 &\{E_i \in E_{P_i^{ESHG:(V,E)}}, \\
 &\forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|\}. \\
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperJoin}
 \end{aligned}$$

$$\begin{aligned}
 &= (OTHERWISE). \\
 &\{\}, \\
 &\text{If } \exists P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \neq \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} \\
 &= (PERFECT MATCHING). \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 &z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 &\text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperJoin SuperHyperPolynomial}} \\
 &= (OTHERWISE)0. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperJoin}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperJoin SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{ExtremeCardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}}
 \end{aligned}$$

is a longest SuperHyperJoin taken from a connected ExtremeSuperHyperMultipartite  $ESHM$  : 2395  
 $(V, E)$ . There's a new way to redefine as 2396

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 2397  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. Then there's 2398  
 no at least one SuperHyperJoin. Thus the notion of quasi may be up but the SuperHyperNotions 2399  
 based on SuperHyperJoin could be applied. There are only  $z'$  SuperHyperParts. Thus every 2400  
 SuperHyperPart could have one SuperHyperVertex as the representative in the 2401

$$P :$$

$$\begin{aligned}
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . 2402  
Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart 2403  
SuperHyperEdges are attained in any solution 2404

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . The 2405  
latter is straightforward. ■ 2406

136EXM22a

**Example 19.0.13.** In the Figure (30.5), the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the 2408  
Algorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected 2409  
ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , in the ExtremeSuperHyperModel (30.5), is 2410  
the ExtremeSuperHyperJoin. 2411

**Proposition 19.0.14.** Assume a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . Then, 2412

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperJoin} = \\
 &= \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperJoin} \text{ SuperHyperPolynomial} \\
 &= 3\mathcal{Z}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperJoin} \\
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperJoin} \text{ SuperHyperPolynomial} \\
 &= \prod |V_{ESHG:(V,E)}^{EXTERNAL}|_{ExtremeCardinality} \mathcal{Z}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let 2413

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}^{EXTERNAL} \cdot
 \end{aligned}$$

is a longest SuperHyperJoin taken from a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . 2414  
 There's a new way to redefine as 2415

$$\begin{aligned}
 V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 2416  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. Then there's at 2417  
 least one SuperHyperJoin. Thus the notion of quasi isn't up and the SuperHyperNotions based 2418  
 on SuperHyperJoin could be applied. The unique embedded SuperHyperJoin proposes some 2419  
 longest SuperHyperJoin excerpt from some representatives. The latter is straightforward. ■ 2420

136EXM23a

**Example 19.0.15.** In the ExtremeFigure (30.6), the connected ExtremeSuperHyperWheel 2421  
 $NSHW : (V, E)$ , is Extremehighlighted and featured. The obtained ExtremeSuperHyperSet, 2422  
 by the Algorithm in previous result, of the ExtremeSuperHyperVertices of the connected 2423  
 ExtremeSuperHyperWheel  $ESHW : (V, E)$ , in the ExtremeSuperHyperModel (30.6), is the 2424  
 ExtremeSuperHyperJoin. 2425

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## ExtremeSuperHyperPerfect But As The Extensions Excerpt From Dense And Super Forms

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**Definition 20.0.1.** (Different ExtremeTypes of ExtremeSuperHyperPerfect). 2430  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2431  
 ExtremeSuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  2432  
 is called 2433

(i) **Extremee-SuperHyperPerfect** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists! E_j \in E'$ , such that 2434  
 $V_a \in E_i, E_j$ ; 2435

(ii) **Extremere-SuperHyperPerfect** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists! E_j \in E'$ , such that 2436  
 $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2437

(iii) **Extremev-SuperHyperPerfect** if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists! V_j \in V'$ , such that 2438  
 $V_i, V_j \in E_a$ ; 2439

(iv) **Extremerv-SuperHyperPerfect** if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists! V_j \in V'$ , such that 2440  
 $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2441

(v) **ExtremeSuperHyperPerfect** if it's either of Extremee-SuperHyperPerfect, Extremere- 2442  
 SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect. 2443

**Definition 20.0.2.** ((Neutrosophic) SuperHyperPerfect). 2444  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2445  
 ExtremeSuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 2446

(i) an **Extreme SuperHyperPerfect** if it's either of Extremee-SuperHyperPerfect, 2447  
 Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect 2448  
 and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme 2449  
 cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme 2450  
 SuperHyperEdges in the consecutive Extreme sequence of Extreme SuperHyperEdges and 2451  
 Extreme SuperHyperVertices such that they form the Extreme SuperHyperPerfect; 2452

- (ii) a **ExtremeSuperHyperPerfect** if it's either of Extremee-SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for a ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperPerfect; 2453-2458
- (iii) an **Extreme SuperHyperPerfect SuperHyperPolynomial** if it's either of Extremee-SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperPerfect; and the Extreme power is corresponded to its Extreme coefficient; 2459-2466
- (iv) a **ExtremeSuperHyperPerfect SuperHyperPolynomial** if it's either of Extremee-SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperPerfect; and the Extremepower is corresponded to its Extremecoefficient; 2467-2474
- (v) an **Extreme R-SuperHyperPerfect** if it's either of Extremee-SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperPerfect; 2475-2480
- (vi) a **ExtremeR-SuperHyperPerfect** if it's either of Extremee-SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperPerfect; 2481-2486
- (vii) an **Extreme R-SuperHyperPerfect SuperHyperPolynomial** if it's either of Extremee-SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperPerfect; and the Extreme power is corresponded to its Extreme coefficient; 2487-2495

(viii) a **ExtremeSuperHyperPerfect SuperHyperPolynomial** if it's either of Extreme-  
SuperHyperPerfect, Extremere-SuperHyperPerfect, Extremev-SuperHyperPerfect, and  
Extremerv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$   
is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the  
Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperVertices  
of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyper-  
Edges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyper-  
Perfect; and the Extremepower is corresponded to its Extremecoefficient.

**Example 20.0.3.** Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$   
in the mentioned ExtremeFigures in every Extremeitems.

- On the Figure (29.1), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect,  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward.  $E_1$  and  $E_3$  are some  
empty Extreme SuperHyperEdges but  $E_2$  is a loop ExtremeSuperHyperEdge and  $E_4$   
is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor,  
there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  
 $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an  
Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is** excluded in every given  
ExtremeSuperHyperPerfect.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.2), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect,  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward.  $E_1, E_2$  and  $E_3$  are some  
empty ExtremeSuperHyperEdges but  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms  
of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ .  
The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuper-  
HyperEdge has it as an Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is**  
excluded in every given ExtremeSuperHyperPerfect.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.3), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect,  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2523  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2524

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2525  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2526

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2527  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2528

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_{3i+1_{i=0}^3}, E_{3i+24_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 6z^8. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_{3i+1_{i=0}^7}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 6z^8.\end{aligned}$$

- On the Figure (29.7), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2529  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2530

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_{15}, E_{16}, E_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.8), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2531  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2532

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.9), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2533  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2534

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperPerfect}} &= \{E_{3i+1_{i=0}^3}, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperPerfect SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect}} &= \{V_{3i+1_{i=0}^3}, V_{15}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 3z^5. \end{aligned}$$

- On the Figure (29.10), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2535  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2536

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3. \end{aligned}$$

- On the Figure (29.11), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2537  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2538

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_6, V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= \\ 3 \times 2z^2. \end{aligned}$$

- On the Figure (29.12), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2539  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2540

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1, V_{i=4}^{i \neq 5,7,8}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 5z^5. \end{aligned}$$

- On the Figure (29.13), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2541  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2542

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_3, E_9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= \\ 3 \times 3z^2. \end{aligned}$$

- On the Figure (29.14), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2543  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2544

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.15), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2545  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2546

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.16), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2547  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2548

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect}} &= \{V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &(1 \times 5 \times 5) + (1 \times 2 + 1)z^3.\end{aligned}$$

- On the Figure (29.17), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2549  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2550

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &(1 \times 1 \times 2 + 1)z^4.\end{aligned}$$

- On the Figure (29.18), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, 2551  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2552

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &(1 \times 1 \times 2 + 1)z^4.\end{aligned}$$

- On the Figure (29.19), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2553  
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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 3z^4. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect}} &= \{V_{2i+1_{i=0^5}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 2z^6.\end{aligned}$$

- On the Figure (29.20), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2555  
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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.21), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2557  
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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperPerfect SuperHyperPolynomial}} &= 10z.\end{aligned}$$

- On the Figure (29.22), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperPerfect, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2559  
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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect}} &= \{V_3, V_6\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 10 \times 6 + 10 \times 6 + 12 \times 6 + 12 \times 6z^2.\end{aligned}$$

The previous Extremeapproach apply on the upcoming Extremeresults on ExtremeSuperHyperClasses. 2561  
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**Proposition 20.0.4.** Assume a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect SuperHyperPolynomial} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect SuperHyperPolynomial} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. ■

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**Example 20.0.5.** In the Figure (30.1), the connected ExtremeSuperHyperPath  $ESHP : (V, E)$ , is highlighted and featured. The ExtremeSuperHyperSet, in the ExtremeSuperHyperModel (30.1), is the SuperHyperPerfect.

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**Proposition 20.0.6.** Assume a connected ExtremeSuperHyperCycle  $ESHC : (V, E)$ . Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect SuperHyperPolynomial} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}. \\
 & \mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}} \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} \approx \frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}
 \end{aligned}$$

*Proof.* Let

2573

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}, V^{EXTERNAL}_{\frac{|E_{ESHG:(V,E)}|_{ExtremeCardinality}}{3}}
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. ■

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136EXM19a

**Example 20.0.7.** In the Figure (30.2), the connected ExtremeSuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained ExtremeSuperHyperSet, in the ExtremeSuperHyper-Model (30.2), is the Extreme SuperHyperPerfect.

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**Proposition 20.0.8.** Assume a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect SuperHyperPolynomial} \\
 &= |i | E_i \in E_{ESHG:(V,E)}|_{ExtremeCardinality} |z. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

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$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

be a longest path taken a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. ■

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a new way to redefine as

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$$\begin{aligned}
 V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. Then there's no at least one SuperHyperPerfect. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperPerfect could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|, V_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|+1}^{EXTERNAL}}
 \end{aligned}$$

is a longest SuperHyperPerfect taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|, V_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|+1}^{EXTERNAL}}
 \end{aligned}$$

The latter is straightforward.

■ 2603

136EXM21a

**Example 20.0.11.** In the ExtremeFigure (30.4), the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , is Extremehighlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the ExtremeAlgorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , in the ExtremeSuperHyperModel (30.4), is the Extreme SuperHyperPerfect.

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**Proposition 20.0.12.** Assume a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperPerfect} \\
 &= (PERFECT MATCHING). \\
 &\{E_i \in E_{P_i^{ESHG:(V,E)}}, \\
 &\forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|\}. \\
 &\mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperPerfect}
 \end{aligned}$$

$$\begin{aligned}
 &= (OTHERWISE). \\
 &\{\}, \\
 &\text{If } \exists P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \neq \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} \\
 &= (PERFECT MATCHING). \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 &z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 &\text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperPerfect SuperHyperPolynomial}} \\
 &= (OTHERWISE)0. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperPerfect}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, i \neq j\}. \\
 &\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperPerfect SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{ExtremeCardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest SuperHyperPerfect taken from a connected ExtremeSuperHyperMultipartite  $ESHM$  : 2612  
 $(V, E)$ . There's a new way to redefine as 2613

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 2614  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. Then there's 2615  
 no at least one SuperHyperPerfect. Thus the notion of quasi may be up but the SuperHyperNotions 2616  
 based on SuperHyperPerfect could be applied. There are only  $z'$  SuperHyperParts. Thus every 2617  
 SuperHyperPart could have one SuperHyperVertex as the representative in the 2618

$$P :$$

$$\begin{aligned}
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . 2619  
 Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart 2620  
 SuperHyperEdges are attained in any solution 2621

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . The 2622  
 latter is straightforward. ■ 2623

136EXM22a

**Example 20.0.13.** In the Figure (30.5), the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the 2625  
 Algorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected 2626  
 ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , in the ExtremeSuperHyperModel (30.5), is 2627  
 the ExtremeSuperHyperPerfect. 2628

**Proposition 20.0.14.** Assume a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . Then, 2629

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperPerfect \ SuperHyperPolynomial} \\
 &= |i \mid E_i \in E_{ESHG:(V,E)}|_{ExtremeCardinality} z. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperPerfect \ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let 2630

$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

is a longest SuperHyperPerfect taken from a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . There's a new way to redefine as 2631  
 2632

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 2633  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. Then there's 2634

at least one SuperHyperPerfect. Thus the notion of quasi isn't up and the SuperHyperNotions 2635  
based on SuperHyperPerfect could be applied. The unique embedded SuperHyperPerfect 2636  
proposes some longest SuperHyperPerfect excerpt from some representatives. The latter is 2637  
straightforward. ■ 2638

136EXM23a

**Example 20.0.15.** In the ExtremeFigure (30.6), the connected ExtremeSuperHyperWheel 2639  
 $NSHW : (V, E)$ , is Extremehighlighted and featured. The obtained ExtremeSuperHyperSet, 2640  
by the Algorithm in previous result, of the ExtremeSuperHyperVertices of the connected 2641  
ExtremeSuperHyperWheel  $ESHW : (V, E)$ , in the ExtremeSuperHyperModel (30.6), is the 2642  
ExtremeSuperHyperPerfect. 2643

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## ExtremeSuperHyperTotal But As The Extensions Excerpt From Dense And Super Forms

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**Definition 21.0.1.** (Different ExtremeTypes of ExtremeSuperHyperTotal). 2648

Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an ExtremeSuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  is called 2649  
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(i) **Extremee-SuperHyperTotal** if  $\forall E_i \in E_{ESHG:(V,E)}, \exists! E_j \in E'$ , such that  $V_a \in E_i, E_j$ ; 2652

(ii) **Extremere-SuperHyperTotal** if  $\forall E_i \in E_{ESHG:(V,E)}, \exists! E_j \in E'$ , such that  $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2653  
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(iii) **Extremev-SuperHyperTotal** if  $\forall V_i \in V_{ESHG:(V,E)}, \exists! V_j \in V'$ , such that  $V_i, V_j \in E_a$ ; 2655

(iv) **Extremerv-SuperHyperTotal** if  $\forall V_i \in V_{ESHG:(V,E)}, \exists! V_j \in V'$ , such that  $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2656  
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(v) **ExtremeSuperHyperTotal** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal. 2658  
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**Definition 21.0.2.** ((Neutrosophic) SuperHyperTotal). 2660

Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an ExtremeSuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 2661  
2662

(i) an **Extreme SuperHyperTotal** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal; 2663  
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(ii) a **ExtremeSuperHyperTotal** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and 2669  
2670

- $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperTotal; 2671-2674
- (iii) an **Extreme SuperHyperTotal SuperHyperPolynomial** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal; and the Extreme power is corresponded to its Extreme coefficient; 2675-2682
- (iv) a **ExtremeSuperHyperTotal SuperHyperPolynomial** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperTotal; and the Extremepower is corresponded to its Extremecoefficient; 2683-2690
- (v) an **Extreme R-SuperHyperTotal** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal; 2691-2696
- (vi) a **ExtremeR-SuperHyperTotal** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperTotal; 2697-2702
- (vii) an **Extreme R-SuperHyperTotal SuperHyperPolynomial** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal; and the Extreme power is corresponded to its Extreme coefficient; 2703-2711
- (viii) a **ExtremeSuperHyperTotal SuperHyperPolynomial** if it's either of Extremee-SuperHyperTotal, Extremere-SuperHyperTotal, Extremev-SuperHyperTotal, and 2712-2713

Extremerv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperTotal; and the Extremepower is corresponded to its Extremecoefficient.

**Example 21.0.3.** Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned ExtremeFigures in every Extremeitems.

- On the Figure (29.1), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, is up. The ExtremeAlgorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some empty Extreme SuperHyperEdges but  $E_2$  is a loop ExtremeSuperHyperEdge and  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an Extremepoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is** excluded in every given ExtremeSuperHyperTotal.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.2), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, is up. The ExtremeAlgorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some empty ExtremeSuperHyperEdges but  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an Extremepoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , **is** excluded in every given ExtremeSuperHyperTotal.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.3), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, is up. The ExtremeAlgorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3z.\end{aligned}$$

136EXM1

- On the Figure (29.4), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2739  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2740

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeQuasi-}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 15z^2. \end{aligned}$$

- On the Figure (29.5), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2741  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2742

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.6), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2743  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2744

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal SuperHyperPolynomial}} &= 20z^{10}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal}} &= \{V_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal SuperHyperPolynomial}} &= 20z^{10}. \end{aligned}$$

- On the Figure (29.7), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2745  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2746

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_{12}, E_{13}, E_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= z^3. \end{aligned}$$

- On the Figure (29.8), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2747  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2748

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &3 \times 4 \times 4z^3. \end{aligned}$$

- On the Figure (29.9), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2749  
 is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2750

$$\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal}} = \{E_{i+1}_{i=0}^9\}.$$

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal SuperHyperPolynomial}} &= 10z^{10}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal}} &= \{V_{i+1}_{i=0}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal SuperHyperPolynomial}} &= 20z^{10}. \end{aligned}$$

- On the Figure (29.10), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2751  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2752

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3. \end{aligned}$$

- On the Figure (29.11), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2753  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2754

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_1, E_6, E_7, E_8\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 2z^4. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= 3z^2. \end{aligned}$$

- On the Figure (29.12), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2755  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2756

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 5z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_{i=1}^{i \neq 4,5,6}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= z^5. \end{aligned}$$

- On the Figure (29.13), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2757  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2758

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_3, E_9, E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 3z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= 3z^2. \end{aligned}$$

- On the Figure (29.14), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2759  
is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2760

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_3\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= 2z^2. \end{aligned}$$

- On the Figure (29.15), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2761  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2762

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_2, V_3, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= z^3.\end{aligned}$$

- On the Figure (29.16), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2763  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2764

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &4 \times 3z^3.\end{aligned}$$

- On the Figure (29.17), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2765  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2766

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &4 \times 3z^4.\end{aligned}$$

- On the Figure (29.18), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2767  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2768

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &2 \times 4 \times 3z^4.\end{aligned}$$

- On the Figure (29.19), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, 2769  
 is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2770

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal}} &= \{E_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal SuperHyperPolynomial}} &= 11z^{10}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal}} &= \{V_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 11z^{10}.\end{aligned}$$

- On the Figure (29.20), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2771  
2772

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_6, E_{10}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 9z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= (|V| - 1)z^2. \end{aligned}$$

- On the Figure (29.21), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2773  
2774

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal}} &= \{V_1, V_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal SuperHyperPolynomial}} &= 9z^2. \end{aligned}$$

- On the Figure (29.22), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperTotal, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2775  
2776

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperTotal}} &= \{V_3, V_{10}, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3 \times 6z^3. \end{aligned}$$

The previous Extremeapproach apply on the upcoming Extremeresults on ExtremeSuperHyperClasses. 2777  
2778

**Proposition 21.0.4.** Assume a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . Then 2779

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal}} &= \\ &= \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperTotal SuperHyperPolynomial}} &= z^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal}} &= \\ &= \{V_i^{\text{EXTERNAL}}\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperTotal SuperHyperPolynomial}} &= \prod |V^{\text{EXTERNAL}}_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} z^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2} \end{aligned}$$

*Proof.* Let

2780

$$\begin{aligned}
 P : \\
 &V_2^{EXTERNAL}, E_2, \\
 &V_3^{EXTERNAL}, E_3, \\
 &\dots, \\
 &E_{|E|^{E_{ESHG:(V,E)}|ExtremeCardinality^{-1}}, V^{EXTERNAL}_{|E_{ESHG:(V,E)}|ExtremeCardinality^{-1}}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. ■

136EXM18a

**Example 21.0.5.** In the Figure (30.1), the connected ExtremeSuperHyperPath  $ESHP : (V, E)$ , is highlighted and featured. The ExtremeSuperHyperSet, in the ExtremeSuperHyperModel (30.1), is the SuperHyperTotal.

**Proposition 21.0.6.** Assume a connected ExtremeSuperHyperCycle  $ESHC : (V, E)$ . Then

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} = \\
 &= \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|ExtremeCardinality^{-2}}. \\
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperTotal SuperHyperPolynomial} \\
 &= (|E_{ESHG:(V,E)}|ExtremeCardinality - 1) \\
 &z^{|E_{ESHG:(V,E)}|ExtremeCardinality^{-2}}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperTotal} \\
 &= \{V_i^{EXTERNAL}\}_{i=1}^{|E_{ESHG:(V,E)}|ExtremeCardinality^{-2}}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperTotal SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|ExtremeCardinality z^{|E_{ESHG:(V,E)}|ExtremeCardinality^{-2}}
 \end{aligned}$$

*Proof.* Let

2789

$$\begin{aligned}
 P : \\
 &V_2^{EXTERNAL}, E_2, \\
 &V_3^{EXTERNAL}, E_3, \\
 &\dots, \\
 &E_{|E|^{E_{ESHG:(V,E)}|ExtremeCardinality^{-1}}, V^{EXTERNAL}_{|E_{ESHG:(V,E)}|ExtremeCardinality^{-1}}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

$$\begin{aligned} V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. ■

136EXM19a

**Example 21.0.7.** In the Figure (30.2), the connected ExtremeSuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained ExtremeSuperHyperSet, in the ExtremeSuperHyper-Model (30.2), is the Extreme SuperHyperTotal.

**Proposition 21.0.8.** Assume a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . Then

$$\begin{aligned} \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} &= \{E_i, E_j \in E_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal \ SuperHyperPolynomial} &= |i(i-1) \mid E_i \in E_{ESHG:(V,E)}|_{ExtremeCardinality} z^2. \\ \mathcal{C}(NSHG)_{ExtremeR-SuperHyperTotal} &= \{CENTER, V_j \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{ExtremeR-SuperHyperTotal \ SuperHyperPolynomial} &= (|V_{ESHG:(V,E)}|_{ExtremeCardinality}) \text{ choose } (|V_{ESHG:(V,E)}|_{ExtremeCardinality} - 1) z^2. \end{aligned}$$

*Proof.* Let

$$P : V_i^{EXTERNAL}, E_i, CENTER, E_j.$$

be a longest path taken a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

$$\begin{aligned} V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. ■

136EXM20a

**Example 21.0.9.** In the Figure (30.3), the connected ExtremeSuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous Extremesresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperStar  $ESHS : (V, E)$ , in the ExtremeSuperHyperModel (30.3), is the ExtremeSuperHyperTotal.

**Proposition 21.0.10.** Assume a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Then 2807

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} \\
 &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\
 & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal SuperHyperPolynomial} \\
 &= z^{\min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} \\
 &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{ExtremeCardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

2808

$$\begin{aligned}
 P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . There's 2809  
 a new way to redefine as 2810

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 2811  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. Then there's 2812  
 no at least one SuperHyperTotal. Thus the notion of quasi may be up but the SuperHyperNotions 2813  
 based on SuperHyperTotal could be applied. There are only two SuperHyperParts. Thus every 2814  
 SuperHyperPart could have one SuperHyperVertex as the representative in the 2815

$$\begin{aligned}
 P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2
 \end{aligned}$$

is a longest SuperHyperTotal taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart 2816  
 SuperHyperEdges are attained in any solution 2817  
 2818

$$P :$$

$$V_1^{EXTERNAL}, E_1,$$

$$V_2^{EXTERNAL}, E_2$$

The latter is straightforward. ■ 2819

136EXM21a

**Example 21.0.11.** In the ExtremeFigure (30.4), the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , is Extremehighlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the ExtremeAlgorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , in the ExtremeSuperHyperModel (30.4), is the Extreme SuperHyperTotal. 2820  
2821  
2822  
2823  
2824

**Proposition 21.0.12.** Assume a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Then 2825  
2826

$$\begin{aligned} & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} \\ & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal SuperHyperPolynomial} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperTotal SuperHyperPolynomial} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{ExtremeCardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let 2827

$$P :$$

$$V_1^{EXTERNAL}, E_1,$$

$$V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperTotal taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as 2828  
2829

$$\begin{aligned} & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z. \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. Then there's 2830  
2831

no at least one SuperHyperTotal. Thus the notion of quasi may be up but the SuperHyperNotions 2832  
 based on SuperHyperTotal could be applied. There are only  $z'$  SuperHyperParts. Thus every 2833  
 SuperHyperPart could have one SuperHyperVertex as the representative in the 2834

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . 2835  
 Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart 2836  
 SuperHyperEdges are attained in any solution 2837

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . The 2838  
 latter is straightforward. ■ 2839

136EXM22a

**Example 21.0.13.** In the Figure (30.5), the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , 2840  
 is highlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the 2841  
 Algorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected 2842  
 ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , in the ExtremeSuperHyperModel (30.5), is 2843  
 the ExtremeSuperHyperTotal. 2844

**Proposition 21.0.14.** Assume a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . Then, 2845

$$\begin{aligned} \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal} &= \{E_i, E_j \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{ExtremeSuperHyperTotal SuperHyperPolynomial} \\ &= |i(i-1) \mid E_i \in E_{ESHG:(V,E)}^*|_{ExtremeCardinality} z^2. \\ \mathcal{C}(NSHG)_{ExtremeR-SuperHyperTotal} &= \{CENTER, V_j \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{ExtremeR-SuperHyperTotal SuperHyperPolynomial} &= \\ &(|V_{ESHG:(V,E)}|_{ExtremeCardinality}) \text{ choose } (|V_{ESHG:(V,E)}|_{ExtremeCardinality} - 1) \\ &z^2. \end{aligned}$$

*Proof.* Let 2846

$$P : V_i^{EXTERNAL}, E_i^*, CENTER, E_j.$$

is a longest SuperHyperTotal taken from a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . 2847  
 There's a new way to redefine as 2848

$$\begin{aligned} V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. Then there’s at least one SuperHyperTotal. Thus the notion of quasi isn’t up and the SuperHyperNotions based on SuperHyperTotal could be applied. The unique embedded SuperHyperTotal proposes some longest SuperHyperTotal excerpt from some representatives. The latter is straightforward. ■

136EXM23a

**Example 21.0.15.** In the ExtremeFigure (30.6), the connected ExtremeSuperHyperWheel  $NSHW : (V, E)$ , is Extremehighlighted and featured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous result, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ , in the ExtremeSuperHyperModel (30.6), is the ExtremeSuperHyperTotal.



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# ExtremeSuperHyperConnected But As The Extensions Excerpt From Dense And Super Forms

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**Definition 22.0.1.** (Different ExtremeTypes of ExtremeSuperHyperConnected). 2863  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2864  
 ExtremeSuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  2865  
 is called 2866

- (i) **Extremee-SuperHyperConnected** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that 2867  
 $V_a \in E_i, E_j$ ; and  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; 2868
- (ii) **Extremere-SuperHyperConnected** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that 2869  
 $V_a \in E_i, E_j$ ;  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  2870  
 $|E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2871
- (iii) **Extremev-SuperHyperConnected** if  $\forall V_i \in E_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 2872  
 $V_i, V_j \notin E_a$ ; and  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; 2873
- (iv) **Extremerv-SuperHyperConnected** if  $\forall V_i \in E_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 2874  
 $V_i, V_j \in E_a$ ;  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  2875  
 $|V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 2876
- (v) **ExtremeSuperHyperConnected** if it's either of Extremee-SuperHyperConnected, 2877  
 Extremere-SuperHyperConnected, Extremev-SuperHyperConnected, and Extremerv- 2878  
 SuperHyperConnected. 2879

**Definition 22.0.2.** ((Neutrosophic) SuperHyperConnected). 2880  
 Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider an 2881  
 ExtremeSuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 2882

- (i) an **Extreme SuperHyperConnected** if it's either of Extremee-SuperHyperConnected, 2883  
 Extremere-SuperHyperConnected, Extremev-SuperHyperConnected, and Extremerv- 2884  
 SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  2885  
 is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme 2886

- cardinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperConnected; 2887  
2888  
2889
- (ii) a **ExtremeSuperHyperConnected** if it's either of Extreme-SuperHyperConnected, 2890  
Extremere-SuperHyperConnected, Extremev-SuperHyperConnected, and Extremerv- 2891  
SuperHyperConnected and  $\mathcal{C}(NSHG)$  for a ExtremeSuperHyperGraph  $NSHG : (V, E)$  2892  
is the maximum Extremecardinality of the ExtremeSuperHyperEdges of an ExtremeSu- 2893  
perHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and 2894  
ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperConnected; 2895
- (iii) an **Extreme SuperHyperConnected SuperHyperPolynomial** if it's either 2896  
of Extreme-SuperHyperConnected, Extremere-SuperHyperConnected, Extremev- 2897  
SuperHyperConnected, and Extremerv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an 2898  
Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial con- 2899  
tains the Extreme coefficients defined as the Extreme number of the maximum Extreme 2900  
cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high 2901  
Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVer- 2902  
tices such that they form the Extreme SuperHyperConnected; and the Extreme power is 2903  
corresponded to its Extreme coefficient; 2904
- (iv) a **ExtremeSuperHyperConnected SuperHyperPolynomial** if it's either 2905  
of Extreme-SuperHyperConnected, Extremere-SuperHyperConnected, Extremev- 2906  
SuperHyperConnected, and Extremerv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an 2907  
ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains 2908  
the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality 2909  
of the ExtremeSuperHyperEdges of an ExtremeSuperHyperSet  $S$  of high Extremecardinality 2910  
consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they 2911  
form the ExtremeSuperHyperConnected; and the Extremepower is corresponded to its 2912  
Extremecoefficient; 2913
- (v) an **Extreme R-SuperHyperConnected** if it's either of Extreme-SuperHyperConnected, 2914  
Extremere-SuperHyperConnected, Extremev-SuperHyperConnected, and Extremerv- 2915  
SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  2916  
is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme 2917  
cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of 2918  
Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the 2919  
Extreme SuperHyperConnected; 2920
- (vi) a **ExtremeR-SuperHyperConnected** if it's either of Extreme-SuperHyperConnected, 2921  
Extremere-SuperHyperConnected, Extremev-SuperHyperConnected, and Extremerv- 2922  
SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  2923  
is the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSu- 2924  
perHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and 2925  
ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperConnected; 2926
- (vii) an **Extreme R-SuperHyperConnected SuperHyperPolynomial** if it's either 2927  
of Extreme-SuperHyperConnected, Extremere-SuperHyperConnected, Extremev- 2928  
SuperHyperConnected, and Extremerv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an 2929

Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperConnected; and the Extreme power is corresponded to its Extreme coefficient;

(viii) a **ExtremeSuperHyperConnected SuperHyperPolynomial** if it's either of Extreme-SuperHyperConnected, Extremere-SuperHyperConnected, Extremev-SuperHyperConnected, and Extremerv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an ExtremeSuperHyperGraph  $NSHG : (V, E)$  is the ExtremeSuperHyperPolynomial contains the Extremecoefficients defined as the Extremenumber of the maximum Extremecardinality of the ExtremeSuperHyperVertices of an ExtremeSuperHyperSet  $S$  of high Extremecardinality consecutive ExtremeSuperHyperEdges and ExtremeSuperHyperVertices such that they form the ExtremeSuperHyperConnected; and the Extremepower is corresponded to its Extremecoefficient.

**Example 22.0.3.** Assume an ExtremeSuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned ExtremeFigures in every Extremeitems.

- On the Figure (29.1), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward.  $E_1$  and  $E_3$  are some empty Extreme SuperHyperEdges but  $E_2$  is a loop ExtremeSuperHyperEdge and  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , is excluded in every given ExtremeSuperHyperConnected.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.2), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward.  $E_1, E_2$  and  $E_3$  are some empty ExtremeSuperHyperEdges but  $E_4$  is an ExtremeSuperHyperEdge. Thus in the terms of ExtremeSuperHyperNeighbor, there's only one ExtremeSuperHyperEdge, namely,  $E_4$ . The ExtremeSuperHyperVertex,  $V_3$  is Extremeisolated means that there's no ExtremeSuperHyperEdge has it as an Extremeendpoint. Thus the ExtremeSuperHyperVertex,  $V_3$ , is excluded in every given ExtremeSuperHyperConnected.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected SuperHyperPolynomial}} &= 3z. \end{aligned}$$

136EXM1

- On the Figure (29.3), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2962  
2963

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2964  
2965

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected}} &= \{E_1, E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2966  
2967

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2968  
2969

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial}} &= 20z^{10}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected}} &= \{V_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 20z^{10}.\end{aligned}$$

- On the Figure (29.7), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2970  
2971

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_{12}, E_{13}, E_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= z^3.\end{aligned}$$

- On the Figure (29.8), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2972  
2973

$$\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} = \{E_4\}.$$

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.9), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2974  
2975

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial}} &= 10z^{10}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected}} &= \{V_{i+1}_{i=11}^{19}, V_{22}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected SuperHyperPolynomial}} &= 20z^{10}.\end{aligned}$$

- On the Figure (29.10), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2976  
2977

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.11), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2978  
2979

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_1, E_6, E_7, E_8\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 2z^4. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 3z^2.\end{aligned}$$

- On the Figure (29.12), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2980  
2981

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= 5z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_{i=1}^{i \neq 4,5,6}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^5.\end{aligned}$$

- On the Figure (29.13), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperConnected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2982  
2983

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_3, E_9, E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 3z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= 3z^2.\end{aligned}$$

- On the Figure (29.14), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2984  
 nected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2985

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.15), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2986  
 nected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2987

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_2, V_3, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \end{aligned}$$

- On the Figure (29.16), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2988  
 nected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2989

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= \\ &4 \times 3z^3. \end{aligned}$$

- On the Figure (29.17), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2990  
 nected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2991

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= \\ &4 \times 3z^4. \end{aligned}$$

- On the Figure (29.18), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2992  
 nected, is up. The ExtremeAlgorithm is Neutrosophicly straightforward. 2993

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= \\ &2 \times 4 \times 3z^4. \end{aligned}$$

- On the Figure (29.19), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2994  
 nected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2995

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected}} &= \{E_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial}} &= 11z^{10}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected}} &= \{V_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 11z^{10}. \end{aligned}$$

- On the Figure (29.20), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2996  
 nected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2997

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.21), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 2998  
 nected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 2999

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeSuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{ExtremeR-SuperHyperConnected SuperHyperPolynomial}} &= 10z. \end{aligned}$$

- On the Figure (29.22), the ExtremeSuperHyperNotion, namely, ExtremeSuperHyperCon- 3000  
 nected, is up. The ExtremeAlgorithm is Neutrosophically straightforward. 3001

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_3, V_{10}, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 3 \times 6z^3. \end{aligned}$$

The previous Extremeapproach apply on the upcoming Extremeresults on ExtremeSuperHy- 3002  
 perClasses. 3003

**Proposition 22.0.4.** Assume a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . Then

3004

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected}} = \\
 & = \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial}} \\
 & = z^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected}} \\
 & = \{V_i^{\text{EXTERNAL}}\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected SuperHyperPolynomial}} \\
 & = \prod |V_i^{\text{EXTERNAL}}|_{ESHG:(V,E)} |_{\text{ExtremeCardinality}} z^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}
 \end{aligned}$$

*Proof.* Let

3005

$$\begin{aligned}
 & P : \\
 & V_2^{\text{EXTERNAL}}, E_2, \\
 & V_3^{\text{EXTERNAL}}, E_3, \\
 & \dots, \\
 & E_{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 1}, V_{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 1}^{\text{EXTERNAL}}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperPath  $ESHP : (V, E)$ . There's a new way to redefine as

3006

3007

$$\begin{aligned}
 & V_i^{\text{EXTERNAL}} \sim V_j^{\text{EXTERNAL}} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{\text{EXTERNAL}})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{\text{EXTERNAL}}$  in the literatures of SuperHyperConnected. The latter is straightforward. ■

3008

3009

136EXM18a

**Example 22.0.5.** In the Figure (30.1), the connected ExtremeSuperHyperPath  $ESHP : (V, E)$ , is highlighted and featured. The ExtremeSuperHyperSet, in the ExtremeSuperHyperModel (30.1), is the SuperHyperConnected.

3010

3011

3012

**Proposition 22.0.6.** Assume a connected ExtremeSuperHyperCycle  $ESHC : (V, E)$ . Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected}} = \\
 & = \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial}} \\
 & = (|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 1) \\
 & z^{|E_{ESHG:(V,E)}|_{\text{ExtremeCardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeR-Quasi-SuperHyperConnected}}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{|E_{ESHG:(V,E)}|_{ExtremeCardinality} - 2}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-Quasi-SuperHyperConnected} \text{ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{ExtremeCardinality} z^{|E_{ESHG:(V,E)}|_{ExtremeCardinality} - 2}
 \end{aligned}$$

*Proof.* Let

3014

$$\begin{aligned}
 &P : \\
 &V_2^{EXTERNAL}, E_2, \\
 &V_3^{EXTERNAL}, E_3, \\
 &\dots, \\
 &E_{|E_{ESHG:(V,E)}|_{ExtremeCardinality} - 1}, V^{EXTERNAL}_{|E_{ESHG:(V,E)}|_{ExtremeCardinality} - 1}.
 \end{aligned}$$

be a longest path taken from a connected ExtremeSuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

3015  
3016

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. ■

3017  
3018

136EXM19a

**Example 22.0.7.** In the Figure (30.2), the connected ExtremeSuperHyperCycle  $NSHC : (V, E)$  is highlighted and featured. The obtained ExtremeSuperHyperSet, in the ExtremeSuperHyper-Model (30.2), is the Extreme SuperHyperConnected.

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3021

**Proposition 22.0.8.** Assume a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . Then

3022

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperConnected} = \{E_i \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeSuperHyperConnected} \text{ SuperHyperPolynomial} \\
 &= |i| |E_i \in |E_{ESHG:(V,E)}|_{ExtremeCardinality} z|. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperConnected} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{ExtremeR-SuperHyperConnected} \text{ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

3023

$$P : V_i^{EXTERNAL}, E_i, CENTER, E_j.$$

be a longest path taken a connected ExtremeSuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

3024  
3025

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. ■

3026  
3027

**Example 22.0.9.** In the Figure (30.3), the connected ExtremeSuperHyperStar  $ESHS : (V, E)$ , 3028  
 is highlighted and featured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous 3029  
 Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperStar 3030  
 $ESHS : (V, E)$ , in the ExtremeSuperHyperModel (30.3), is the ExtremeSuperHyperConnected. 3031

**Proposition 22.0.10.** Assume a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Then 3032

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected}} \\
 &= \{E_a \in E_{P_i ESHG:(V,E)}, \\
 & \quad \forall P_i ESHG:(V,E), |P_i ESHG:(V,E)| = \min_i |P_i ESHG:(V,E) \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial}} \\
 &= z^{\min_i |P_i ESHG:(V,E) \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i ESHG:(V,E), |P_i ESHG:(V,E)| \\
 &= \min_i |P_i ESHG:(V,E) \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeV-SuperHyperConnected}} \\
 &= \{V_a^{EXTERNAL} \in V_{P_i ESHG:(V,E)}^{EXTERNAL}, V_b^{EXTERNAL} \in V_{P_j ESHG:(V,E)}^{EXTERNAL}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{ExtremeV-SuperHyperConnected SuperHyperPolynomial}} \\
 &= \sum_{\substack{|V_{ESHG:(V,E)}^{EXTERNAL}| \\ \text{ExtremeCardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i ESHG:(V,E)| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

3033

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2
 \end{aligned}$$

is a longest path taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . There's 3034  
 a new way to redefine as 3035

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 3036  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. Then 3037  
 there's no at least one SuperHyperConnected. Thus the notion of quasi may be up but 3038  
 the SuperHyperNotions based on SuperHyperConnected could be applied. There are only 3039  
 two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the 3040  
 representative in the 3041

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2
 \end{aligned}$$

is a longest SuperHyperConnected taken from a connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

The latter is straightforward. ■ 3045

**Example 22.0.11.** In the ExtremeFigure (30.4), the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , is Extremehighlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the ExtremeAlgorithm in previous Extremesresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperBipartite  $ESHB : (V, E)$ , in the ExtremeSuperHyperModel (30.4), is the Extreme SuperHyperConnected.

**Proposition 22.0.12.** Assume a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperConnected} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{ExtremeQuasi-SuperHyperConnected SuperHyperPolynomial} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{ExtremeV-SuperHyperConnected} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{ExtremeV-SuperHyperConnected SuperHyperPolynomial} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{ExtremeCardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) = z^2. \end{aligned}$$

*Proof.* Let

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperConnected taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

$$\begin{aligned} & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. Then there’s no at least one SuperHyperConnected. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperConnected could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

136EXM22a

**Example 22.0.13.** In the Figure (30.5), the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Extremefeatured. The obtained ExtremeSuperHyperSet, by the Algorithm in previous Extremeresult, of the ExtremeSuperHyperVertices of the connected ExtremeSuperHyperMultipartite  $ESHM : (V, E)$ , in the ExtremeSuperHyperModel (30.5), is the ExtremeSuperHyperConnected.

**Proposition 22.0.14.** Assume a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . Then,

$$\begin{aligned} \mathcal{C}(NSHG)_{ExtremesuperHyperConnected} &= \{E_i \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{ExtremesuperHyperConnected\ SuperHyperPolynomial} \\ &= |i \mid E_i \in |E_{ESHG:(V,E)}^*|_{Extremecardinality}|z. \\ \mathcal{C}(NSHG)_{ExtremesuperHyperV-SuperHyperConnected} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{ExtremesuperHyperV-SuperHyperConnected\ SuperHyperPolynomial} &= z. \end{aligned}$$

*Proof.* Let

$$P : V^{EXTERNAL}_i, E^*_i, CENTER, E_j.$$

is a longest SuperHyperConnected taken from a connected ExtremeSuperHyperWheel  $ESHW : (V, E)$ . There’s a new way to redefine as

$$\begin{aligned} V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded 3076  
to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. 3077  
Then there’s at least one SuperHyperConnected. Thus the notion of quasi isn’t up and 3078  
the SuperHyperNotions based on SuperHyperConnected could be applied. The unique 3079  
embedded SuperHyperConnected proposes some longest SuperHyperConnected excerpt from 3080  
some representatives. The latter is straightforward. ■ 3081

136EXM23a

**Example 22.0.15.** In the ExtremeFigure (30.6), the connected ExtremeSuperHyperWheel 3082  
 $NSHW : (V, E)$ , is Extremehighlighted and featured. The obtained ExtremeSuperHyperSet, 3083  
by the Algorithm in previous result, of the ExtremeSuperHyperVertices of the connected 3084  
ExtremeSuperHyperWheel  $ESHW : (V, E)$ , in the ExtremeSuperHyperModel (30.6), is the 3085  
ExtremeSuperHyperConnected. 3086



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CHAPTER 24

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**New Ideas In Cancer's Recognition And  
Neutrosophic SuperHyperGraph By  
SuperHyperDominating As Hyper Closing  
On Super Messy**

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ABSTRACT

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In this scientific research, (Different Neutrosophic Types of Neutrosophic SuperHyperDominating). 3263  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 3264  
 Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  3265  
 or  $E'$  is called Neutrosophic e-SuperHyperDominating if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such 3266  
 that  $V_a \in E_i, E_j$ ; Neutrosophic re-SuperHyperDominating if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , 3267  
 such that  $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 3268  
 Neutrosophic v-SuperHyperDominating if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \in E_a$ ; 3269  
 and Neutrosophic rv-SuperHyperDominating if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 3270  
 $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; Neutro- 3271  
 sophic SuperHyperDominating if it's either of Neutrosophic e-SuperHyperDominating, Neutro- 3272  
 sophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv- 3273  
 SuperHyperDominating. ((Neutrosophic) SuperHyperDominating). Assume a Neutrosophic Super- 3274  
 rHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperEdge 3275  
 (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called an Extreme SuperHyperDominating if it's either of 3276  
 Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic 3277  
 v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an 3278  
 Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme 3279  
 SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperEdges in the consecutive 3280  
 Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they 3281  
 form the Extreme SuperHyperDominating; a Neutrosophic SuperHyperDominating if it's either of 3282  
 Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic 3283  
 v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a 3284  
 Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of 3285  
 the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic 3286  
 cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices 3287  
 such that they form the Neutrosophic SuperHyperDominating; an Extreme SuperHyperDom- 3288  
 inating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutro- 3289  
 sophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic 3290  
 rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  3291  
 is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Ex- 3292  
 treme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an 3293  
 Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges 3294  
 and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; 3295

and the Extreme power is corresponded to its Extreme coefficient; a Neutrosophic SuperHyperDominating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient; an Extreme V-SuperHyperDominating if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; a Neutrosophic V-SuperHyperDominating if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; an Extreme V-SuperHyperDominating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; and the Extreme power is corresponded to its Extreme coefficient; a Neutrosophic SuperHyperDominating SuperHyperPolynomial if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient. In this scientific research, new setting is introduced for new SuperHyperNotions, namely, a SuperHyperDominating and Neutrosophic SuperHyperDominating. Two different types of SuperHyperDefinitions are debut for them but the research goes further and the SuperHyperNotion, SuperHyperUniform, and SuperHyperClass based on that are well-defined and well-reviewed. The literature review is implemented in the whole of this research. For shining the elegancy and the significance of this research, the comparison between this SuperHyperNotion with other SuperHyperNotions and fundamental SuperHyperNumbers are featured. The definitions are followed by the examples

and the instances thus the clarifications are driven with different tools. The applications are 3342  
figured out to make sense about the theoretical aspect of this ongoing research. The “Cancer’s 3343  
Recognition” are the under research to figure out the challenges make sense about ongoing and 3344  
upcoming research. The special case is up. The cells are viewed in the deemed ways. There are 3345  
different types of them. Some of them are individuals and some of them are well-modeled by 3346  
the group of cells. These types are all officially called “SuperHyperVertex” but the relations 3347  
amid them all officially called “SuperHyperEdge”. The frameworks “SuperHyperGraph” and 3348  
“Neutrosophic SuperHyperGraph” are chosen and elected to research about “Cancer’s Recog- 3349  
nition”. Thus these complex and dense SuperHyperModels open up some avenues to research 3350  
on theoretical segments and “Cancer’s Recognition”. Some avenues are posed to pursue this 3351  
research. It’s also officially collected in the form of some questions and some problems. As- 3352  
sume a SuperHyperGraph. Assume a SuperHyperGraph. Then  $\delta$ -SuperHyperDominating is 3353  
a maximal of SuperHyperVertices with a maximum cardinality such that either of the fol- 3354  
lowing expressions hold for the (Neutrosophic) cardinalities of SuperHyperNeighbors of  $s \in S$  : 3355  
there are  $|S \cap N(s)| > |S \cap (V \setminus N(s))| + \delta$ ; and  $|S \cap N(s)| < |S \cap (V \setminus N(s))| + \delta$ . The 3356  
first Expression, holds if  $S$  is an  $\delta$ -SuperHyperOffensive. And the second Expression, holds 3357  
if  $S$  is an  $\delta$ -SuperHyperDefensive; a Neutrosophic  $\delta$ -SuperHyperDominating is a maximal 3358  
Neutrosophic of SuperHyperVertices with maximum Neutrosophic cardinality such that 3359  
either of the following expressions hold for the Neutrosophic cardinalities of SuperHyper- 3360  
Neighbors of  $s \in S$  there are:  $|S \cap N(s)|_{Neutrosophic} > |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ ; 3361  
and  $|S \cap N(s)|_{Neutrosophic} < |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta$ . The first Expression, holds 3362  
if  $S$  is a Neutrosophic  $\delta$ -SuperHyperOffensive. And the second Expression, holds if  $S$  is a 3363  
Neutrosophic  $\delta$ -SuperHyperDefensive It’s useful to define a “Neutrosophic” version of a Super- 3364  
HyperDominating . Since there’s more ways to get type-results to make a SuperHyperDominating 3365  
more understandable. For the sake of having Neutrosophic SuperHyperDominating, there’s a 3366  
need to “redefine” the notion of a “SuperHyperDominating ”. The SuperHyperVertices and the 3367  
SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, 3368  
there’s the usage of the position of labels to assign to the values. Assume a SuperHyperDominating 3369  
. It’s redefined a Neutrosophic SuperHyperDominating if the mentioned Table holds, concerning, 3370  
“The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to 3371  
The Neutrosophic SuperHyperGraph” with the key points, “The Values of The Vertices & The 3372  
Number of Position in Alphabet”, “The Values of The SuperVertices&The maximum Values of Its 3373  
Vertices”, “The Values of The Edges&The maximum Values of Its Vertices”, “The Values of The 3374  
HyperEdges&The maximum Values of Its Vertices”, “The Values of The SuperHyperEdges&The 3375  
maximum Values of Its Endpoints”. To get structural examples and instances, I’m going to 3376  
introduce the next SuperHyperClass of SuperHyperGraph based on a SuperHyperDominating 3377  
. It’s the main. It’ll be disciplinary to have the foundation of previous definition in the kind 3378  
of SuperHyperClass. If there’s a need to have all SuperHyperDominating until the SuperHy- 3379  
perDominating, then it’s officially called a “SuperHyperDominating” but otherwise, it isn’t a 3380  
SuperHyperDominating . There are some instances about the clarifications for the main definition 3381  
titled a “SuperHyperDominating ”. These two examples get more scrutiny and discernment 3382  
since there are characterized in the disciplinary ways of the SuperHyperClass based on a Supe- 3383  
rHyperDominating . For the sake of having a Neutrosophic SuperHyperDominating, there’s a 3384  
need to “redefine” the notion of a “Neutrosophic SuperHyperDominating” and a “Neutrosophic 3385  
SuperHyperDominating ”. The SuperHyperVertices and the SuperHyperEdges are assigned by 3386  
the labels from the letters of the alphabets. In this procedure, there’s the usage of the position 3387

of labels to assign to the values. Assume a Neutrosophic SuperHyperGraph. It's redefined 3388  
"Neutrosophic SuperHyperGraph" if the intended Table holds. And a SuperHyperDominating are 3389  
redefined to a "Neutrosophic SuperHyperDominating" if the intended Table holds. It's useful to 3390  
define "Neutrosophic" version of SuperHyperClasses. Since there's more ways to get Neutrosophic 3391  
type-results to make a Neutrosophic SuperHyperDominating more understandable. Assume a 3392  
Neutrosophic SuperHyperGraph. There are some Neutrosophic SuperHyperClasses if the intended 3393  
Table holds. Thus SuperHyperPath, SuperHyperDominating, SuperHyperStar, SuperHyperBi- 3394  
partite, SuperHyperMultiPartite, and SuperHyperWheel, are "Neutrosophic SuperHyperPath", 3395  
"Neutrosophic SuperHyperDominating", "Neutrosophic SuperHyperStar", "Neutrosophic Super- 3396  
HyperBipartite", "Neutrosophic SuperHyperMultiPartite", and "Neutrosophic SuperHyperWheel" 3397  
if the intended Table holds. A SuperHyperGraph has a "Neutrosophic SuperHyperDominating" 3398  
where it's the strongest [the maximum Neutrosophic value from all the SuperHyperDominating 3399  
amid the maximum value amid all SuperHyperVertices from a SuperHyperDominating .] Super- 3400  
HyperDominating . A graph is a SuperHyperUniform if it's a SuperHyperGraph and the number 3401  
of elements of SuperHyperEdges are the same. Assume a Neutrosophic SuperHyperGraph. There 3402  
are some SuperHyperClasses as follows. It's SuperHyperPath if it's only one SuperVertex as 3403  
intersection amid two given SuperHyperEdges with two exceptions; it's SuperHyperDominating if 3404  
it's only one SuperVertex as intersection amid two given SuperHyperEdges; it's SuperHyperStar 3405  
it's only one SuperVertex as intersection amid all SuperHyperEdges; it's SuperHyperBipartite it's 3406  
only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, 3407  
forming two separate sets, has no SuperHyperEdge in common; it's SuperHyperMultiPartite it's 3408  
only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, 3409  
forming multi separate sets, has no SuperHyperEdge in common; it's a SuperHyperWheel if it's 3410  
only one SuperVertex as intersection amid two given SuperHyperEdges and one SuperVertex 3411  
has one SuperHyperEdge with any common SuperVertex. The SuperHyperModel proposes 3412  
the specific designs and the specific architectures. The SuperHyperModel is officially called 3413  
"SuperHyperGraph" and "Neutrosophic SuperHyperGraph". In this SuperHyperModel, The 3414  
"specific" cells and "specific group" of cells are SuperHyperModeled as "SuperHyperVertices" 3415  
and the common and intended properties between "specific" cells and "specific group" of cells 3416  
are SuperHyperModeled as "SuperHyperEdges". Sometimes, it's useful to have some degrees of 3417  
determinacy, indeterminacy, and neutrality to have more precise SuperHyperModel which in this 3418  
case the SuperHyperModel is called "Neutrosophic". In the future research, the foundation will 3419  
be based on the "Cancer's Recognition" and the results and the definitions will be introduced 3420  
in redeemed ways. The recognition of the cancer in the long-term function. The specific region 3421  
has been assigned by the model [it's called SuperHyperGraph] and the long cycle of the move 3422  
from the cancer is identified by this research. Sometimes the move of the cancer hasn't be easily 3423  
identified since there are some determinacy, indeterminacy and neutrality about the moves and 3424  
the effects of the cancer on that region; this event leads us to choose another model [it's said 3425  
to be Neutrosophic SuperHyperGraph] to have convenient perception on what's happened and 3426  
what's done. There are some specific models, which are well-known and they've got the names, 3427  
and some SuperHyperGeneral SuperHyperModels. The moves and the traces of the cancer on the 3428  
complex tracks and between complicated groups of cells could be fantasized by a Neutrosophic 3429  
SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyper- 3430  
Multipartite, SuperHyperWheel). The aim is to find either the longest SuperHyperDominating 3431  
or the strongest SuperHyperDominating in those Neutrosophic SuperHyperModels. For the 3432  
longest SuperHyperDominating, called SuperHyperDominating, and the strongest SuperHyper- 3433

Dominating, called Neutrosophic SuperHyperDominating, some general results are introduced. 3434  
Beyond that in SuperHyperStar, all possible SuperHyperPaths have only two SuperHyperEdges 3435  
but it's not enough since it's essential to have at least three SuperHyperEdges to form any style of 3436  
a SuperHyperDominating. There isn't any formation of any SuperHyperDominating but literarily, 3437  
it's the deformation of any SuperHyperDominating. It, literarily, deforms and it doesn't form. 3438  
A basic familiarity with Neutrosophic SuperHyperDominating theory, SuperHyperGraphs, and 3439  
Neutrosophic SuperHyperGraphs theory are proposed. 3440

**Keywords:** Neutrosophic SuperHyperGraph, SuperHyperDominating, Cancer's Neutrosophic 3441

Recognition 3442

**AMS Subject Classification:** 05C17, 05C22, 05E45 3443



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## Background

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There are some scientific researches covering the topic of this research. In what follows, there are some discussion and literature reviews about them date back on January 22, 2023.

First article is titled “properties of SuperHyperGraph and neutrosophic SuperHyperGraph” in **Ref. [HG1]** by Henry Garrett (2022). It’s first step toward the research on neutrosophic SuperHyperGraphs. This research article is published on the journal “Neutrosophic Sets and Systems” in issue 49 and the pages 531-561. In this research article, different types of notions like dominating, resolving, coloring, Eulerian(Hamiltonian) neutrosophic path, n-Eulerian(Hamiltonian) neutrosophic path, zero forcing number, zero forcing neutrosophic- number, independent number, independent neutrosophic-number, clique number, clique neutrosophic-number, matching number, matching neutrosophic-number, girth, neutrosophic girth, 1-zero-forcing number, 1-zero- forcing neutrosophic-number, failed 1-zero-forcing number, failed 1-zero-forcing neutrosophic-number, global- offensive alliance, t-offensive alliance, t-defensive alliance, t-powerful alliance, and global- powerful alliance are defined in SuperHyperGraph and neutrosophic SuperHyperGraph. Some Classes of SuperHyperGraph and Neutrosophic SuperHyperGraph are cases of research. Some results are applied in family of SuperHyperGraph and neutrosophic SuperHyperGraph. Thus this research article has concentrated on the vast notions and introducing the majority of notions.

The seminal paper and groundbreaking article is titled “neutrosophic co-degree and neutrosophic degree alongside chromatic numbers in the setting of some classes related to neutrosophic hypergraphs” in **Ref. [HG2]** by Henry Garrett (2022). In this research article, a novel approach is implemented on SuperHyperGraph and neutrosophic SuperHyperGraph based on general forms without using neutrosophic classes of neutrosophic SuperHyperGraph. It’s published in prestigious and fancy journal is entitled “Journal of Current Trends in Computer Science Research (JCTCSR)” with abbreviation “J Curr Trends Comp Sci Res” in volume 1 and issue 1 with pages 06-14. The research article studies deeply with choosing neutrosophic hypergraphs instead of neutrosophic SuperHyperGraph. It’s the breakthrough toward independent results based on initial background.

The seminal paper and groundbreaking article is titled “Super Hyper Dominating and Super Hyper Resolving on Neutrosophic Super Hyper Graphs and Their Directions in Game Theory and Neutrosophic Super Hyper Classes” in **Ref. [HG3]** by Henry Garrett (2022). In this research article, a novel approach is implemented on SuperHyperGraph and neutrosophic SuperHyperGraph based on fundamental SuperHyperNumber and using neutrosophic SuperHyperClasses of neutrosophic SuperHyperGraph. It’s published in prestigious and fancy journal is entitled “Journal of Mathematical Techniques and Computational Mathematics(JMTCM)” with

abbreviation “J Math Techniques Comput Math” in volume 1 and issue 3 with pages 242-263. 3479  
The research article studies deeply with choosing directly neutrosophic SuperHyperGraph and 3480  
SuperHyperGraph. It’s the breakthrough toward independent results based on initial background 3481  
and fundamental SuperHyperNumbers. 3482  
In some articles are titled “0039 | Closing Numbers and SuperV-Closing Numbers as 3483  
(Dual)Resolving and (Dual)Coloring alongside (Dual)Dominating in (Neutrosophic)n- 3484  
SuperHyperGraph” in **Ref. [HG4]** by Henry Garrett (2022), “0049 | (Failed)1-Zero-Forcing 3485  
Number in Neutrosophic Graphs” in **Ref. [HG5]** by Henry Garrett (2022), “Extreme Super- 3486  
HyperClique as the Firm Scheme of Confrontation under Cancer’s Recognition as the Model in 3487  
The Setting of (Neutrosophic) SuperHyperGraphs” in **Ref. [HG6]** by Henry Garrett (2022), 3488  
“Uncertainty On The Act And Effect Of Cancer Alongside The Foggy Positions Of Cells Toward 3489  
Neutrosophic Failed SuperHyperClique inside Neutrosophic SuperHyperGraphs Titled Cancer’s 3490  
Recognition” in **Ref. [HG7]** by Henry Garrett (2022), “Neutrosophic Version Of Separates 3491  
Groups Of Cells In Cancer’s Recognition On Neutrosophic SuperHyperGraphs” in **Ref. [HG8]** 3492  
by Henry Garrett (2022), “The Shift Paradigm To Classify Separately The Cells and Affected 3493  
Cells Toward The Totality Under Cancer’s Recognition By New Multiple Definitions On the 3494  
Sets Polynomials Alongside Numbers In The (Neutrosophic) SuperHyperMatching Theory 3495  
Based on SuperHyperGraph and Neutrosophic SuperHyperGraph” in **Ref. [HG9]** by Henry 3496  
Garrett (2022), “Breaking the Continuity and Uniformity of Cancer In The Worst Case of 3497  
Full Connections With Extreme Failed SuperHyperClique In Cancer’s Recognition Applied in 3498  
(Neutrosophic) SuperHyperGraphs” in **Ref. [HG10]** by Henry Garrett (2022), “Neutrosophic 3499  
Failed SuperHyperStable as the Survivors on the Cancer’s Neutrosophic Recognition Based 3500  
on Uncertainty to All Modes in Neutrosophic SuperHyperGraphs” in **Ref. [HG11]** by Henry 3501  
Garrett (2022), “Extremism of the Attacked Body Under the Cancer’s Circumstances Where 3502  
Cancer’s Recognition Titled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG12]** by Henry 3503  
Garrett (2022), “(Neutrosophic) 1-Failed SuperHyperForcing in Cancer’s Recognitions And 3504  
(Neutrosophic) SuperHyperGraphs” in **Ref. [HG13]** by Henry Garrett (2022), “Neutrosophic 3505  
Messy-Style SuperHyperGraphs To Form Neutrosophic SuperHyperStable To Act on Cancer’s 3506  
Neutrosophic Recognitions In Special ViewPoints” in **Ref. [HG14]** by Henry Garrett (2022), 3507  
“Neutrosophic 1-Failed SuperHyperForcing in the SuperHyperFunction To Use Neutrosophic 3508  
SuperHyperGraphs on Cancer’s Neutrosophic Recognition And Beyond” in **Ref. [HG15]** by 3509  
Henry Garrett (2022), “(Neutrosophic) SuperHyperStable on Cancer’s Recognition by Well- 3510  
SuperHyperModelled (Neutrosophic) SuperHyperGraphs ” in **Ref. [HG16]** by Henry Garrett 3511  
(2022), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neutrosophic SuperHyperStable 3512  
To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” in **Ref. [HG12]** by 3513  
Henry Garrett (2022), “Basic Notions on (Neutrosophic) SuperHyperForcing And (Neutrosophic) 3514  
SuperHyperModeling in Cancer’s Recognitions And (Neutrosophic) SuperHyperGraphs” in 3515  
**Ref. [HG17]** by Henry Garrett (2022), “Neutrosophic Messy-Style SuperHyperGraphs To 3516  
Form Neutrosophic SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special 3517  
ViewPoints” in **Ref. [HG18]** by Henry Garrett (2022),“(Neutrosophic) SuperHyperModeling of 3518  
Cancer’s Recognitions Featuring (Neutrosophic) SuperHyperDefensive SuperHyperAlliances” in 3519  
**Ref. [HG19]** by Henry Garrett (2022), “(Neutrosophic) SuperHyperAlliances With SuperHyper- 3520  
Defensive and SuperHyperOffensive Type-SuperHyperSet On (Neutrosophic) SuperHyperGraph 3521  
With (Neutrosophic) SuperHyperModeling of Cancer’s Recognitions And Related (Neutro- 3522  
sophic) SuperHyperClasses” in **Ref. [HG20]** by Henry Garrett (2022), “SuperHyperGirth on 3523  
SuperHyperGraph and Neutrosophic SuperHyperGraph With SuperHyperModeling of Cancer’s 3524

Recognitions” in **Ref. [HG21]** by Henry Garrett (2022), “Some SuperHyperDegrees and 3525  
Co-SuperHyperDegrees on Neutrosophic SuperHyperGraphs and SuperHyperGraphs Alongside 3526  
Applications in Cancer’s Treatments” in **Ref. [HG22]** by Henry Garrett (2022), “Super- 3527  
HyperDominating and SuperHyperResolving on Neutrosophic SuperHyperGraphs And Their 3528  
Directions in Game Theory and Neutrosophic SuperHyperClasses” in **Ref. [HG23]** by Henry 3529  
Garrett (2022), “SuperHyperMatching By (V-)Definitions And Polynomials To Monitor Cancer’s 3530  
Recognition In Neutrosophic SuperHyperGraphs” in **Ref. [HG24]** by Henry Garrett (2023), 3531  
“The Focus on The Partitions Obtained By Parallel Moves In The Cancer’s Extreme Recognition 3532  
With Different Types of Extreme SuperHyperMatching Set and Polynomial on (Neutrosophic) 3533  
SuperHyperGraphs” in **Ref. [HG25]** by Henry Garrett (2023), “Extreme Failed SuperHyper- 3534  
Clique Decides the Failures on the Cancer’s Recognition in the Perfect Connections of Cancer’s 3535  
Attacks By SuperHyperModels Named (Neutrosophic) SuperHyperGraphs” in **Ref. [HG26]** by 3536  
Henry Garrett (2023), “Indeterminacy On The All Possible Connections of Cells In Front of 3537  
Cancer’s Attacks In The Terms of Neutrosophic Failed SuperHyperClique on Cancer’s Recognition 3538  
called Neutrosophic SuperHyperGraphs” in **Ref. [HG27]** by Henry Garrett (2023), “Perfect 3539  
Directions Toward Idealism in Cancer’s Neutrosophic Recognition Forwarding Neutrosophic 3540  
SuperHyperClique on Neutrosophic SuperHyperGraphs” in **Ref. [HG28]** by Henry Garrett 3541  
(2023), “Demonstrating Complete Connections in Every Embedded Regions and Sub-Regions in 3542  
the Terms of Cancer’s Recognition and (Neutrosophic) SuperHyperGraphs With (Neutrosophic) 3543  
SuperHyperClique” in **Ref. [HG29]** by Henry Garrett (2023), “Different Neutrosophic Types of 3544  
Neutrosophic Regions titled neutrosophic Failed SuperHyperStable in Cancer’s Neutrosophic 3545  
Recognition modeled in the Form of Neutrosophic SuperHyperGraphs” in **Ref. [HG30]** by 3546  
Henry Garrett (2023), “Using the Tool As (Neutrosophic) Failed SuperHyperStable To SuperHyper- 3547  
perModel Cancer’s Recognition Titled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG31]** by 3548  
Henry Garrett (2023), “Neutrosophic Messy-Style SuperHyperGraphs To Form Neutrosophic 3549  
SuperHyperStable To Act on Cancer’s Neutrosophic Recognitions In Special ViewPoints” in **Ref.** 3550  
**[HG32]** by Henry Garrett (2023), “(Neutrosophic) SuperHyperStable on Cancer’s Recognition 3551  
by Well-SuperHyperModelled (Neutrosophic) SuperHyperGraphs” in **Ref. [HG33]** by Henry 3552  
Garrett (2023), “Neutrosophic 1-Failed SuperHyperForcing in the SuperHyperFunction To Use 3553  
Neutrosophic SuperHyperGraphs on Cancer’s Neutrosophic Recognition And Beyond” in **Ref.** 3554  
**[HG34]** by Henry Garrett (2022), “(Neutrosophic) 1-Failed SuperHyperForcing in Cancer’s 3555  
Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref. [HG35]** by Henry Garrett (2022), 3556  
“Basic Notions on (Neutrosophic) SuperHyperForcing And (Neutrosophic) SuperHyperMod- 3557  
eling in Cancer’s Recognitions And (Neutrosophic) SuperHyperGraphs” in **Ref. [HG36]** by 3558  
Henry Garrett (2022), “Basic Neutrosophic Notions Concerning SuperHyperDominating and 3559  
Neutrosophic SuperHyperResolving in SuperHyperGraph” in **Ref. [HG37]** by Henry Garrett 3560  
(2022), “Initial Material of Neutrosophic Preliminaries to Study Some Neutrosophic Notions 3561  
Based on Neutrosophic SuperHyperEdge (NSHE) in Neutrosophic SuperHyperGraph (NSHG)” 3562  
in **Ref. [HG38]** by Henry Garrett (2022), there are some endeavors to formalize the basic 3563  
SuperHyperNotions about neutrosophic SuperHyperGraph and SuperHyperGraph. 3564  
Some scientific studies and scientific researches about neutrosophic graphs, are proposed as book 3565  
in **Ref. [HG39]** by Henry Garrett (2022) which is indexed by Google Scholar and has more 3566  
than 3230 readers in Scribd. It’s titled “Beyond Neutrosophic Graphs” and published by Ohio: 3567  
E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United 3568  
State. This research book covers different types of notions and settings in neutrosophic graph 3569  
theory and neutrosophic SuperHyperGraph theory. 3570

Also, some scientific studies and scientific researches about neutrosophic graphs, are proposed 3571  
as book in **Ref. [HG40]** by Henry Garrett (2022) which is indexed by Google Scholar and has 3572  
more than 4117 readers in Scribd. It's titled "Neutrosophic Duality" and published by Florida: 3573  
GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 3574  
United States. This research book presents different types of notions SuperHyperResolving and 3575  
SuperHyperDominating in the setting of duality in neutrosophic graph theory and neutrosophic 3576  
SuperHyperGraph theory. This research book has scrutiny on the complement of the intended set 3577  
and the intended set, simultaneously. It's smart to consider a set but acting on its complement 3578  
that what's done in this research book which is popular in the terms of high readers in Scribd. 3579  
See the seminal scientific researches [**HG1; HG2; HG3**]. The formalization of the notions on 3580  
the framework of Extreme SuperHyperDominating theory, Neutrosophic SuperHyperDominating 3581  
theory, and (Neutrosophic) SuperHyperGraphs theory at [**HG4; HG5; HG6; HG7; HG8;** 3582  
**HG9; HG10; HG11; HG12; HG13; HG14; HG15; HG16; HG17; HG18; HG19; HG20;** 3583  
**HG21; HG22; HG23; HG24; HG25; HG26; HG27; HG28; HG29; HG30; HG31; HG32;** 3584  
**HG33; HG34; HG35; HG36; HG37; HG38**]. Two popular scientific research books in Scribd 3585  
in the terms of high readers, 3230 and 4117 respectively, on neutrosophic science is on [**HG39;** 3586  
**HG40**]. 3587

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## Applied Notions Under The Scrutiny Of The Motivation Of This Scientific Research

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In this scientific research, there are some ideas in the featured frameworks of motivations. I try to bring the motivations in the narrative ways. Some cells have been faced with some attacks from the situation which is caused by the cancer's attacks. In this case, there are some embedded analysis on the ongoing situations which in that, the cells could be labelled as some groups and some groups or individuals have excessive labels which all are raised from the behaviors to overcome the cancer's attacks. In the embedded situations, the individuals of cells and the groups of cells could be considered as "new groups". Thus it motivates us to find the proper SuperHyperModels for getting more proper analysis on this messy story. I've found the SuperHyperModels which are officially called "SuperHyperGraphs" and "Neutrosophic SuperHyperGraphs". In this SuperHyperModel, the cells and the groups of cells are defined as "SuperHyperVertices" and the relations between the individuals of cells and the groups of cells are defined as "SuperHyperEdges". Thus it's another motivation for us to do research on this SuperHyperModel based on the "Cancer's Recognition". Sometimes, the situations get worst. The situation is passed from the certainty and precise style. Thus it's the beyond them. There are three descriptions, namely, the degrees of determinacy, indeterminacy and neutrality, for any object based on vague forms, namely, incomplete data, imprecise data, and uncertain analysis. The latter model could be considered on the previous SuperHyperModel. It's SuperHyperModel. It's SuperHyperGraph but it's officially called "Neutrosophic SuperHyperGraphs". The cancer is the disease but the model is going to figure out what's going on this phenomenon. The special case of this disease is considered and as the consequences of the model, some parameters are used. The cells are under attack of this disease but the moves of the cancer in the special region are the matter of mind. The recognition of the cancer could help to find some treatments for this disease. The SuperHyperGraph and Neutrosophic SuperHyperGraph are the SuperHyperModels on the "Cancer's Recognition" and both bases are the background of this research. Sometimes the cancer has been happened on the region, full of cells, groups of cells and embedded styles. In this segment, the SuperHyperModel proposes some SuperHyperNotions based on the connectivities of the moves of the cancer in the forms of alliances' styles with the formation of the design and the architecture are formally called "SuperHyperDominating" in the themes of jargons and buzzwords. The prefix "SuperHyper" refers to the theme of the embedded styles to figure out the background for the SuperHyperNotions. The recognition of the cancer in the long-term function. The specific region has been assigned by the model [it's called SuperHyperGraph] and the long cycle of the move from the cancer is

identified by this research. Sometimes the move of the cancer hasn't be easily identified since 3622  
there are some determinacy, indeterminacy and neutrality about the moves and the effects of the 3623  
cancer on that region; this event leads us to choose another model [it's said to be Neutrosophic 3624  
SuperHyperGraph] to have convenient perception on what's happened and what's done. There 3625  
are some specific models, which are well-known and they've got the names, and some general 3626  
models. The moves and the traces of the cancer on the complex tracks and between complicated 3627  
groups of cells could be fantasized by a Neutrosophic SuperHyperPath (-/SuperHyperDominating, 3628  
SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). The aim is 3629  
to find either the optimal SuperHyperDominating or the Neutrosophic SuperHyperDominating 3630  
in those Neutrosophic SuperHyperModels. Some general results are introduced. Beyond that in 3631  
SuperHyperStar, all possible Neutrosophic SuperHyperPath s have only two SuperHyperEdges 3632  
but it's not enough since it's essential to have at least three SuperHyperEdges to form any style of 3633  
a SuperHyperDominating. There isn't any formation of any SuperHyperDominating but literarily, 3634  
it's the deformation of any SuperHyperDominating. It, literarily, deforms and it doesn't form. 3635

**Question 27.0.1.** *How to define the SuperHyperNotions and to do research on them to find the “ 3636  
amount of SuperHyperDominating” of either individual of cells or the groups of cells based on the 3637  
fixed cell or the fixed group of cells, extensively, the “amount of SuperHyperDominating” based 3638  
on the fixed groups of cells or the fixed groups of group of cells? 3639*

**Question 27.0.2.** *What are the best descriptions for the “Cancer's Recognition” in terms of these 3640  
messy and dense SuperHyperModels where embedded notions are illustrated? 3641*

It's motivation to find notions to use in this dense model is titled “SuperHyperGraphs”. 3642  
Thus it motivates us to define different types of “ SuperHyperDominating” and “Neutrosophic 3643  
SuperHyperDominating” on “SuperHyperGraph” and “Neutrosophic SuperHyperGraph”. Then 3644  
the research has taken more motivations to define SuperHyperClasses and to find some connections 3645  
amid this SuperHyperNotion with other SuperHyperNotions. It motivates us to get some instances 3646  
and examples to make clarifications about the framework of this research. The general results 3647  
and some results about some connections are some avenues to make key point of this research, 3648  
“Cancer's Recognition”, more understandable and more clear. 3649

The framework of this research is as follows. In the beginning, I introduce basic definitions 3650  
to clarify about preliminaries. In the subsection “Preliminaries”, initial definitions about 3651  
SuperHyperGraphs and Neutrosophic SuperHyperGraph are deeply-introduced and in-depth- 3652  
discussed. The elementary concepts are clarified and illustrated completely and sometimes 3653  
review literature are applied to make sense about what's going to figure out about the 3654  
upcoming sections. The main definitions and their clarifications alongside some results about 3655  
new notions, SuperHyperDominating and Neutrosophic SuperHyperDominating, are figured 3656  
out in sections “ SuperHyperDominating” and “Neutrosophic SuperHyperDominating”. In 3657  
the sense of tackling on getting results and in order to make sense about continuing the 3658  
research, the ideas of SuperHyperUniform and Neutrosophic SuperHyperUniform are introduced 3659  
and as their consequences, corresponded SuperHyperClasses are figured out to debut what's 3660  
done in this section, titled “Results on SuperHyperClasses” and “Results on Neutrosophic 3661  
SuperHyperClasses”. As going back to origin of the notions, there are some smart steps toward 3662  
the common notions to extend the new notions in new frameworks, SuperHyperGraph and 3663  
Neutrosophic SuperHyperGraph, in the sections “Results on SuperHyperClasses” and “Results on 3664  
Neutrosophic SuperHyperClasses”. The starter research about the general SuperHyperRelations 3665  
and as concluding and closing section of theoretical research are contained in the section 3666

“General Results”. Some general SuperHyperRelations are fundamental and they are well- 3667  
known as fundamental SuperHyperNotions as elicited and discussed in the sections, “General 3668  
Results”, “ SuperHyperDominating”, “Neutrosophic SuperHyperDominating”, “Results on 3669  
SuperHyperClasses” and “Results on Neutrosophic SuperHyperClasses”. There are curious 3670  
questions about what’s done about the SuperHyperNotions to make sense about excellency of this 3671  
research and going to figure out the word “best” as the description and adjective for this research 3672  
as presented in section, “ SuperHyperDominating”. The keyword of this research debut in the 3673  
section “Applications in Cancer’s Recognition” with two cases and subsections “Case 1: The 3674  
Initial Steps Toward SuperHyperBipartite as SuperHyperModel” and “Case 2: The Increasing 3675  
Steps Toward SuperHyperMultipartite as SuperHyperModel”. In the section, “Open Problems”, 3676  
there are some scrutiny and discernment on what’s done and what’s happened in this research in 3677  
the terms of “questions” and “problems” to make sense to figure out this research in featured 3678  
style. The advantages and the limitations of this research alongside about what’s done in this 3679  
research to make sense and to get sense about what’s figured out are included in the section, 3680  
“Conclusion and Closing Remarks”. 3681



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# Neutrosophic Preliminaries Of This Scientific Research On the Redeemed Ways

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In this section, the basic material in this scientific research, is referred to [Single Valued Neutrosophic Set](Ref.[HG38],Definition 2.2,p.2), [Neutrosophic Set](Ref.[HG38],Definition 2.1,p.1), [Neutrosophic SuperHyperGraph (NSHG)](Ref.[HG38],Definition 2.5,p.2), [Characterization of the Neutrosophic SuperHyperGraph (NSHG)](Ref.[HG38],Definition 2.7,p.3), [t-norm](Ref.[HG38], Definition 2.7, p.3), and [Characterization of the Neutrosophic SuperHyperGraph (NSHG)](Ref.[HG38],Definition 2.7,p.3), [Neutrosophic Strength of the Neutrosophic SuperHyperPaths] (Ref.[HG38],Definition 5.3,p.7), and [Different Neutrosophic Types of Neutrosophic SuperHyperEdges (NSHE)] (Ref.[HG38],Definition 5.4,p.7). Also, the new ideas and their clarifications are addressed to Ref.[HG38].

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In this subsection, the basic material which is used in this scientific research, is presented. Also, the new ideas and their clarifications are elicited.

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**Definition 28.0.1** (Neutrosophic Set). (Ref.[HG38],Definition 2.1,p.1).

Let  $X$  be a space of points (objects) with generic elements in  $X$  denoted by  $x$ ; then the **Neutrosophic set**  $A$  (NS  $A$ ) is an object having the form

$$A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$$

where the functions  $T, I, F : X \rightarrow ]-0, 1^+[$  define respectively the a **truth-membership function**, an **indeterminacy-membership function**, and a **falsity-membership function** of the element  $x \in X$  to the set  $A$  with the condition

$$-0 \leq T_A(x) + I_A(x) + F_A(x) \leq 3^+.$$

The functions  $T_A(x), I_A(x)$  and  $F_A(x)$  are real standard or nonstandard subsets of  $]-0, 1^+[$ .

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**Definition 28.0.2** (Single Valued Neutrosophic Set). (Ref.[HG38],Definition 2.2,p.2).

Let  $X$  be a space of points (objects) with generic elements in  $X$  denoted by  $x$ . A **single valued Neutrosophic set**  $A$  (SVNS  $A$ ) is characterized by truth-membership function  $T_A(x)$ , an indeterminacy-membership function  $I_A(x)$ , and a falsity-membership function  $F_A(x)$ . For each point  $x$  in  $X$ ,  $T_A(x), I_A(x), F_A(x) \in [0, 1]$ . A SVNS  $A$  can be written as

$$A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}.$$

**Definition 28.0.3.** The **degree of truth-membership, indeterminacy-membership and falsity-membership of the subset**  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$ :

$$T_A(X) = \min[T_A(v_i), T_A(v_j)]_{v_i, v_j \in X},$$

$$I_A(X) = \min[I_A(v_i), I_A(v_j)]_{v_i, v_j \in X},$$

and  $F_A(X) = \min[F_A(v_i), F_A(v_j)]_{v_i, v_j \in X}.$

**Definition 28.0.4.** The **support** of  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$ :

$$\text{supp}(X) = \{x \in X : T_A(x), I_A(x), F_A(x) > 0\}.$$

**Definition 28.0.5** (Neutrosophic SuperHyperGraph (NSHG)). (Ref.[HG38], Definition 2.5,p.2). 3698  
 Assume  $V'$  is a given set. a **Neutrosophic SuperHyperGraph** (NSHG)  $S$  is an ordered pair 3699  
 $S = (V, E)$ , where 3700

- (i)  $V = \{V_1, V_2, \dots, V_n\}$  a finite set of finite single valued Neutrosophic subsets of  $V'$ ; 3701
- (ii)  $V = \{(V_i, T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i)) : T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i) \geq 0\}$ ,  $(i = 1, 2, \dots, n)$ ; 3702
- (iii)  $E = \{E_1, E_2, \dots, E_{n'}\}$  a finite set of finite single valued Neutrosophic subsets of  $V$ ; 3703
- (iv)  $E = \{(E_{i'}, T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'})) : T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'}) \geq 0\}$ ,  $(i' = 1, 2, \dots, n')$ ; 3704
- (v)  $V_i \neq \emptyset$ ,  $(i = 1, 2, \dots, n)$ ; 3705
- (vi)  $E_{i'} \neq \emptyset$ ,  $(i' = 1, 2, \dots, n')$ ; 3706
- (vii)  $\sum_i \text{supp}(V_i) = V$ ,  $(i = 1, 2, \dots, n)$ ; 3707
- (viii)  $\sum_{i'} \text{supp}(E_{i'}) = V$ ,  $(i' = 1, 2, \dots, n')$ ; 3708
- (ix) and the following conditions hold:

$$T'_{V'}(E_{i'}) \leq \min[T_{V'}(V_i), T_{V'}(V_j)]_{V_i, V_j \in E_{i'}},$$

$$I'_{V'}(E_{i'}) \leq \min[I_{V'}(V_i), I_{V'}(V_j)]_{V_i, V_j \in E_{i'}},$$

and  $F'_{V'}(E_{i'}) \leq \min[F_{V'}(V_i), F_{V'}(V_j)]_{V_i, V_j \in E_{i'}}$

where  $i' = 1, 2, \dots, n'$ . 3709

Here the Neutrosophic SuperHyperEdges (NSHE)  $E_{j'}$  and the Neutrosophic SuperHyperVertices 3710  
 (NSHV)  $V_j$  are single valued Neutrosophic sets.  $T_{V'}(V_i), I_{V'}(V_i)$ , and  $F_{V'}(V_i)$  denote the 3711  
 degree of truth-membership, the degree of indeterminacy-membership and the degree of 3712  
 falsity-membership the Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to the Neutrosophic 3713  
 SuperHyperVertex (NSHV)  $V$ .  $T'_{V'}(E_{i'}), I'_{V'}(E_{i'})$ , and  $F'_{V'}(E_{i'})$  denote the degree of truth- 3714  
 membership, the degree of indeterminacy-membership and the degree of falsity-membership 3715  
 of the Neutrosophic SuperHyperEdge (NSHE)  $E_{i'}$  to the Neutrosophic SuperHyperEdge (NSHE) 3716  
 $E$ . Thus, the  $ii'$ th element of the **incidence matrix** of Neutrosophic SuperHyperGraph (NSHG) 3717  
 are of the form  $(V_i, T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'}))$ , the sets  $V$  and  $E$  are crisp sets. 3718

**Definition 28.0.6** (Characterization of the Neutrosophic SuperHyperGraph (NSHG)). (Ref.[HG38], Definition 2.7, p.3).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . The Neutrosophic SuperHyperEdges (NSHE)  $E_{i'}$  and the Neutrosophic SuperHyperVertices (NSHV)  $V_i$  of Neutrosophic SuperHyperGraph (NSHG)  $S = (V, E)$  could be characterized as follow-up items.

- (i) If  $|V_i| = 1$ , then  $V_i$  is called **vertex**;
- (ii) if  $|V_i| \geq 1$ , then  $V_i$  is called **SuperVertex**;
- (iii) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **edge**;
- (iv) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **HyperEdge**;
- (v) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **SuperEdge**;
- (vi) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **SuperHyperEdge**.

If we choose different types of binary operations, then we could get hugely diverse types of general forms of Neutrosophic SuperHyperGraph (NSHG).

**Definition 28.0.7** (t-norm). (Ref.[HG38], Definition 2.7, p.3).

A binary operation  $\otimes : [0, 1] \times [0, 1] \rightarrow [0, 1]$  is a **t-norm** if it satisfies the following for  $x, y, z, w \in [0, 1]$ :

- (i)  $1 \otimes x = x$ ;
- (ii)  $x \otimes y = y \otimes x$ ;
- (iii)  $x \otimes (y \otimes z) = (x \otimes y) \otimes z$ ;
- (iv) If  $w \leq x$  and  $y \leq z$  then  $w \otimes y \leq x \otimes z$ .

**Definition 28.0.8.** The **degree of truth-membership, indeterminacy-membership and falsity-membership of the subset**  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$  (with respect to t-norm  $T_{norm}$ ):

$$T_A(X) = T_{norm}[T_A(v_i), T_A(v_j)]_{v_i, v_j \in X},$$

$$I_A(X) = T_{norm}[I_A(v_i), I_A(v_j)]_{v_i, v_j \in X},$$

and  $F_A(X) = T_{norm}[F_A(v_i), F_A(v_j)]_{v_i, v_j \in X}$ .

**Definition 28.0.9.** The **support** of  $X \subset A$  of the single valued Neutrosophic set  $A = \{ \langle x : T_A(x), I_A(x), F_A(x) \rangle, x \in X \}$ :

$$supp(X) = \{ x \in X : T_A(x), I_A(x), F_A(x) > 0 \}.$$

**Definition 28.0.10.** (General Forms of Neutrosophic SuperHyperGraph (NSHG)).

Assume  $V'$  is a given set. a **Neutrosophic SuperHyperGraph** (NSHG)  $S$  is an ordered pair  $S = (V, E)$ , where

- (i)  $V = \{V_1, V_2, \dots, V_n\}$  a finite set of finite single valued Neutrosophic subsets of  $V'$ ; 3745
- (ii)  $V = \{(V_i, T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i)) : T_{V'}(V_i), I_{V'}(V_i), F_{V'}(V_i) \geq 0\}$ ,  $(i = 1, 2, \dots, n)$ ; 3746
- (iii)  $E = \{E_1, E_2, \dots, E_{n'}\}$  a finite set of finite single valued Neutrosophic subsets of  $V$ ; 3747
- (iv)  $E = \{(E_{i'}, T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'})) : T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'}) \geq 0\}$ ,  $(i' = 1, 2, \dots, n')$ ; 3748
- (v)  $V_i \neq \emptyset$ ,  $(i = 1, 2, \dots, n)$ ; 3749
- (vi)  $E_{i'} \neq \emptyset$ ,  $(i' = 1, 2, \dots, n')$ ; 3750
- (vii)  $\sum_i \text{supp}(V_i) = V$ ,  $(i = 1, 2, \dots, n)$ ; 3751
- (viii)  $\sum_{i'} \text{supp}(E_{i'}) = V$ ,  $(i' = 1, 2, \dots, n')$ . 3752

Here the Neutrosophic SuperHyperEdges (NSHE)  $E_{j'}$  and the Neutrosophic SuperHyperVertices (NSHV)  $V_j$  are single valued Neutrosophic sets.  $T_{V'}(V_i), I_{V'}(V_i)$ , and  $F_{V'}(V_i)$  denote the degree of truth-membership, the degree of indeterminacy-membership and the degree of falsity-membership the Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to the Neutrosophic SuperHyperVertex (NSHV)  $V$ .  $T'_{V'}(E_{i'}), I'_{V'}(E_{i'})$ , and  $F'_{V'}(E_{i'})$  denote the degree of truth-membership, the degree of indeterminacy-membership and the degree of falsity-membership of the Neutrosophic SuperHyperEdge (NSHE)  $E_{i'}$  to the Neutrosophic SuperHyperEdge (NSHE)  $E$ . Thus, the  $ii'$ th element of the **incidence matrix** of Neutrosophic SuperHyperGraph (NSHG) are of the form  $(V_i, T'_{V'}(E_{i'}), I'_{V'}(E_{i'}), F'_{V'}(E_{i'}))$ , the sets  $V$  and  $E$  are crisp sets. 3753-3761

**Definition 28.0.11** (Characterization of the Neutrosophic SuperHyperGraph (NSHG)). (Ref.[HG38], Definition 2.7,p.3). 3762-3763

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . The Neutrosophic SuperHyperEdges (NSHE)  $E_{i'}$  and the Neutrosophic SuperHyperVertices (NSHV)  $V_i$  of Neutrosophic SuperHyperGraph (NSHG)  $S = (V, E)$  could be characterized as follow-up items. 3764-3767

- (i) If  $|V_i| = 1$ , then  $V_i$  is called **vertex**; 3768
- (ii) if  $|V_i| \geq 1$ , then  $V_i$  is called **SuperVertex**; 3769
- (iii) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **edge**; 3770
- (iv) if for all  $V_i$ s are incident in  $E_{i'}$ ,  $|V_i| = 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **HyperEdge**; 3771
- (v) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| = 2$ , then  $E_{i'}$  is called **SuperEdge**; 3772-3773
- (vi) if there's a  $V_i$  is incident in  $E_{i'}$  such that  $|V_i| \geq 1$ , and  $|E_{i'}| \geq 2$ , then  $E_{i'}$  is called **SuperHyperEdge**. 3774-3775

This SuperHyperModel is too messy and too dense. Thus there's a need to have some restrictions and conditions on SuperHyperGraph. The special case of this SuperHyperGraph makes the patterns and regularities. 3776-3778

**Definition 28.0.12.** A graph is **SuperHyperUniform** if it's SuperHyperGraph and the number of elements of SuperHyperEdges are the same. 3779-3780

To get more visions on SuperHyperUniform, the some SuperHyperClasses are introduced. It makes to have SuperHyperUniform more understandable.

**Definition 28.0.13.** Assume a Neutrosophic SuperHyperGraph. There are some SuperHyperClasses as follows.

- (i). It's **Neutrosophic SuperHyperPath** if it's only one SuperVertex as intersection amid two given SuperHyperEdges with two exceptions;
- (ii). it's **SuperHyperCycle** if it's only one SuperVertex as intersection amid two given SuperHyperEdges;
- (iii). it's **SuperHyperStar** it's only one SuperVertex as intersection amid all SuperHyperEdges;
- (iv). it's **SuperHyperBipartite** it's only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, forming two separate sets, has no SuperHyperEdge in common;
- (v). it's **SuperHyperMultiPartite** it's only one SuperVertex as intersection amid two given SuperHyperEdges and these SuperVertices, forming multi separate sets, has no SuperHyperEdge in common;
- (vi). it's **SuperHyperWheel** if it's only one SuperVertex as intersection amid two given SuperHyperEdges and one SuperVertex has one SuperHyperEdge with any common SuperVertex.

**Definition 28.0.14.** Let an ordered pair  $S = (V, E)$  be a Neutrosophic SuperHyperGraph (NSHG)  $S$ . Then a sequence of Neutrosophic SuperHyperVertices (NSHV) and Neutrosophic SuperHyperEdges (NSHE)

$$V_1, E_1, V_2, E_2, V_3, \dots, V_{s-1}, E_{s-1}, V_s$$

is called a **Neutrosophic SuperHyperPath** (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_1$  to Neutrosophic SuperHyperVertex (NSHV)  $V_s$  if either of following conditions hold:

- (i)  $V_i, V_{i+1} \in E_{i'}$ ;
- (ii) there's a vertex  $v_i \in V_i$  such that  $v_i, V_{i+1} \in E_{i'}$ ;
- (iii) there's a SuperVertex  $V'_i \in V_i$  such that  $V'_i, V_{i+1} \in E_{i'}$ ;
- (iv) there's a vertex  $v_{i+1} \in V_{i+1}$  such that  $V_i, v_{i+1} \in E_{i'}$ ;
- (v) there's a SuperVertex  $V'_{i+1} \in V_{i+1}$  such that  $V_i, V'_{i+1} \in E_{i'}$ ;
- (vi) there are a vertex  $v_i \in V_i$  and a vertex  $v_{i+1} \in V_{i+1}$  such that  $v_i, v_{i+1} \in E_{i'}$ ;
- (vii) there are a vertex  $v_i \in V_i$  and a SuperVertex  $V'_{i+1} \in V_{i+1}$  such that  $v_i, V'_{i+1} \in E_{i'}$ ;
- (viii) there are a SuperVertex  $V'_i \in V_i$  and a vertex  $v_{i+1} \in V_{i+1}$  such that  $V'_i, v_{i+1} \in E_{i'}$ ;
- (ix) there are a SuperVertex  $V'_i \in V_i$  and a SuperVertex  $V'_{i+1} \in V_{i+1}$  such that  $V'_i, V'_{i+1} \in E_{i'}$ .

**Definition 28.0.15.** (Characterization of the Neutrosophic SuperHyperPaths).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . a Neutrosophic SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_1$  to Neutrosophic SuperHyperVertex (NSHV)  $V_s$  is sequence of Neutrosophic SuperHyperVertices (NSHV) and Neutrosophic SuperHyperEdges (NSHE)

$$V_1, E_1, V_2, E_2, V_3, \dots, V_{s-1}, E_{s-1}, V_s,$$

could be characterized as follow-up items.

- (i) If for all  $V_i, E_{j'}, |V_i| = 1, |E_{j'}| = 2$ , then NSHP is called **path**;
- (ii) if for all  $E_{j'}, |E_{j'}| = 2$ , and there's  $V_i, |V_i| \geq 1$ , then NSHP is called **SuperPath**;
- (iii) if for all  $V_i, E_{j'}, |V_i| = 1, |E_{j'}| \geq 2$ , then NSHP is called **HyperPath**;
- (iv) if there are  $V_i, E_{j'}, |V_i| \geq 1, |E_{j'}| \geq 2$ , then NSHP is called **Neutrosophic SuperHyper-Path**.

**Definition 28.0.16** (Neutrosophic Strength of the Neutrosophic SuperHyperPaths). (Ref.[HG38],Definition 5.3,p.7).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . A Neutrosophic SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_1$  to Neutrosophic SuperHyperVertex (NSHV)  $V_s$  is sequence of Neutrosophic SuperHyperVertices (NSHV) and Neutrosophic SuperHyperEdges (NSHE)

$$V_1, E_1, V_2, E_2, V_3, \dots, V_{s-1}, E_{s-1}, V_s,$$

have

- (i) **Neutrosophic t-strength**  $(\min\{T(V_i)\}, m, n)_{i=1}^s$ ;
- (ii) **Neutrosophic i-strength**  $(m, \min\{I(V_i)\}, n)_{i=1}^s$ ;
- (iii) **Neutrosophic f-strength**  $(m, n, \min\{F(V_i)\})_{i=1}^s$ ;
- (iv) **Neutrosophic strength**  $(\min\{T(V_i)\}, \min\{I(V_i)\}, \min\{F(V_i)\})_{i=1}^s$ .

**Definition 28.0.17** (Different Neutrosophic Types of Neutrosophic SuperHyperEdges (NSHE)). (Ref.[HG38],Definition 5.4,p.7).

Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called

- (ix) **Neutrosophic t-connective** if  $T(E) \geq$  maximum number of Neutrosophic t-strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ ;
- (x) **Neutrosophic i-connective** if  $I(E) \geq$  maximum number of Neutrosophic i-strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ ;

(xi) **Neutrosophic f-connective** if  $F(E) \geq$  maximum number of Neutrosophic f-strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ ;

(xii) **Neutrosophic connective** if  $(T(E), I(E), F(E)) \geq$  maximum number of Neutrosophic strength of SuperHyperPath (NSHP) from Neutrosophic SuperHyperVertex (NSHV)  $V_i$  to Neutrosophic SuperHyperVertex (NSHV)  $V_j$  where  $1 \leq i, j \leq s$ .

**Definition 28.0.18.** (Different Neutrosophic Types of Neutrosophic SuperHyperDominating). Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  or  $E'$  is called

(i) **Neutrosophic e-SuperHyperDominating** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that  $V_a \in E_i, E_j$ ;

(ii) **Neutrosophic re-SuperHyperDominating** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that  $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ;

(iii) **Neutrosophic v-SuperHyperDominating** if  $\forall V_i \in E_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ;

(iv) **Neutrosophic rv-SuperHyperDominating** if  $\forall V_i \in E_{ESHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that  $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ;

(v) **Neutrosophic SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating.

**Definition 28.0.19.** ((Neutrosophic) SuperHyperDominating). Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called

(i) an **Extreme SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperEdges in the consecutive sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating;

(ii) a **Neutrosophic SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating;

- (iii) an **Extreme SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; and the Extreme power is corresponded to its Extreme coefficient;
- (iv) a **Neutrosophic SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient;
- (v) an **Extreme V-SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating;
- (vi) a **Neutrosophic V-SuperHyperDominating** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating;
- (vii) an **Extreme V-SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neutrosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDominating; and the Extreme power is corresponded to its Extreme coefficient;
- (viii) a **Neutrosophic SuperHyperDominating SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDominating, Neutrosophic re-SuperHyperDominating, Neut-

rosophic v-SuperHyperDominating, and Neutrosophic rv-SuperHyperDominating and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDominating; and the Neutrosophic power is corresponded to its Neutrosophic coefficient.

**Definition 28.0.20.** ((Extreme/Neutrosophic) $\delta$ -SuperHyperDominating). Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Then

- (i) an  $\delta$ -**SuperHyperDominating** is a Neutrosophic kind of Neutrosophic SuperHyperDominating such that either of the following expressions hold for the Neutrosophic cardinalities of SuperHyperNeighbors of  $s \in S$  :

$$|S \cap N(s)| > |S \cap (V \setminus N(s))| + \delta; \quad \boxed{136EQN1}$$

$$|S \cap N(s)| < |S \cap (V \setminus N(s))| + \delta. \quad \boxed{136EQN2}$$

The Expression (28.1), holds if  $S$  is an  $\delta$ -**SuperHyperOffensive**. And the Expression (28.1), holds if  $S$  is an  $\delta$ -**SuperHyperDefensive**;

- (ii) a **Neutrosophic  $\delta$ -SuperHyperDominating** is a Neutrosophic kind of Neutrosophic SuperHyperDominating such that either of the following Neutrosophic expressions hold for the Neutrosophic cardinalities of SuperHyperNeighbors of  $s \in S$  :

$$|S \cap N(s)|_{Neutrosophic} > |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta; \quad \boxed{136EQN3}$$

$$|S \cap N(s)|_{Neutrosophic} < |S \cap (V \setminus N(s))|_{Neutrosophic} + \delta. \quad \boxed{136EQN4}$$

The Expression (28.1), holds if  $S$  is a **Neutrosophic  $\delta$ -SuperHyperOffensive**. And the Expression (28.1), holds if  $S$  is a **Neutrosophic  $\delta$ -SuperHyperDefensive**.

For the sake of having a Neutrosophic SuperHyperDominating, there's a need to “**redefine**” the notion of “Neutrosophic SuperHyperGraph”. The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, there's the usage of the position of labels to assign to the values.

**Definition 28.0.21.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . It's redefined **Neutrosophic SuperHyperGraph** if the Table (28.1) holds.

It's useful to define a “Neutrosophic” version of SuperHyperClasses. Since there's more ways to get Neutrosophic type-results to make a Neutrosophic more understandable.

**Definition 28.0.22.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . There are some **Neutrosophic SuperHyperClasses** if the Table (28.2) holds. Thus Neutrosophic SuperHyperPath, SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultiPartite, and SuperHyperWheel, are **Neutrosophic SuperHyperPath**, **Neutrosophic SuperHyperCycle**, **Neutrosophic SuperHyperStar**, **Neutrosophic SuperHyperBipartite**, **Neutrosophic SuperHyperMultiPartite**, and **Neutrosophic SuperHyperWheel** if the Table (28.2) holds.

136DEF1

136DEF2

Table 28.1: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBL3

Table 28.2: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph, Mentioned in the Definition (28.0.22)

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBL4

Table 28.3: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperGraph Mentioned in the Definition (28.0.23)

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

136TBL1

It's useful to define a "Neutrosophic" version of a Neutrosophic SuperHyperDominating. Since there's more ways to get type-results to make a Neutrosophic SuperHyperDominating more Neutrosophicly understandable.

For the sake of having a Neutrosophic SuperHyperDominating, there's a need to "redefine" the Neutrosophic notion of "Neutrosophic SuperHyperDominating". The SuperHyperVertices and the SuperHyperEdges are assigned by the labels from the letters of the alphabets. In this procedure, there's the usage of the position of labels to assign to the values.

136DEF1

**Definition 28.0.23.** Assume a SuperHyperDominating. It's redefined a **Neutrosophic Super-HyperDominating** if the Table (28.3) holds.

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# Neutrosophic SuperHyperDominating But As The Extensions Excerpt From Dense And Super Forms

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136EXM1

**Example 29.0.1.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned Neutrosophic Figures in every Neutrosophic items.

- On the Figure (29.1), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_2$  is a loop Neutrosophic SuperHyperEdge and  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperDominating.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 3z. \end{aligned}$$

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- On the Figure (29.2), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every

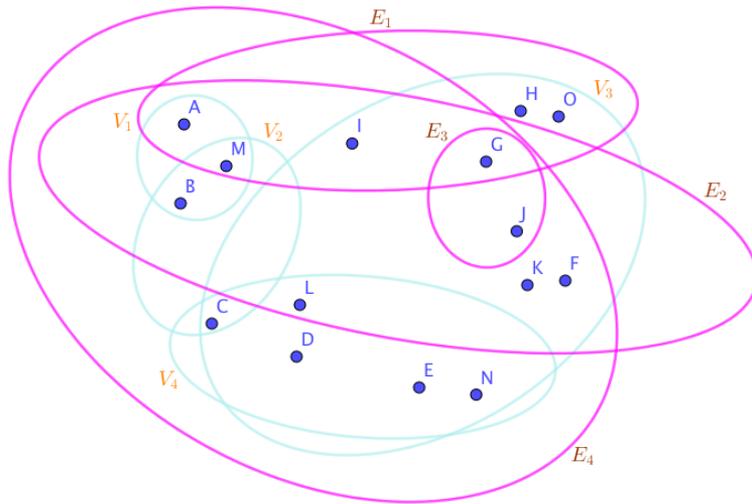


Figure 29.1: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG1

given Neutrosophic SuperHyperDominating.

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$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 3z. \end{aligned}$$

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- On the Figure (29.3), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

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$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 3z. \end{aligned}$$

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- On the Figure (29.4), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

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$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_1, V_4\}. \end{aligned}$$

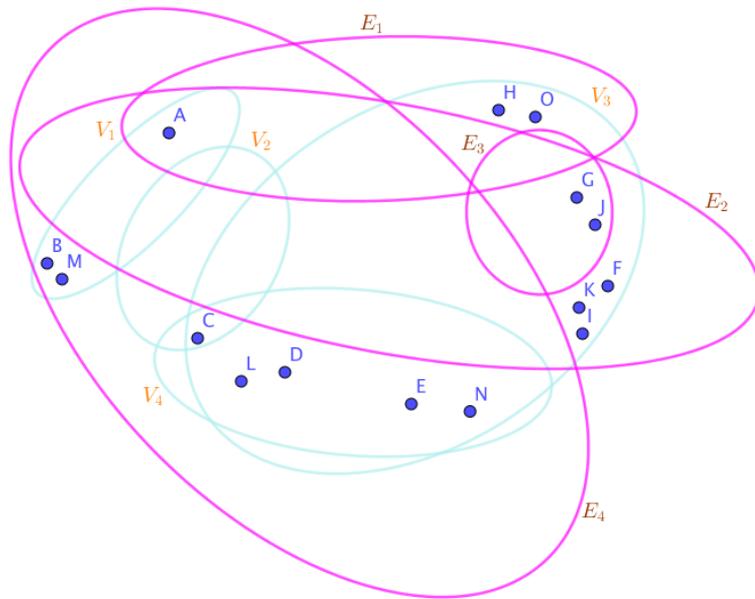


Figure 29.2: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG2

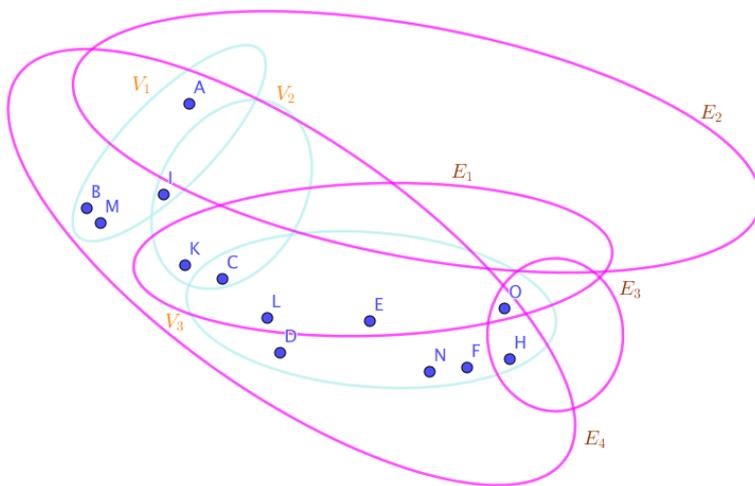


Figure 29.3: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG3

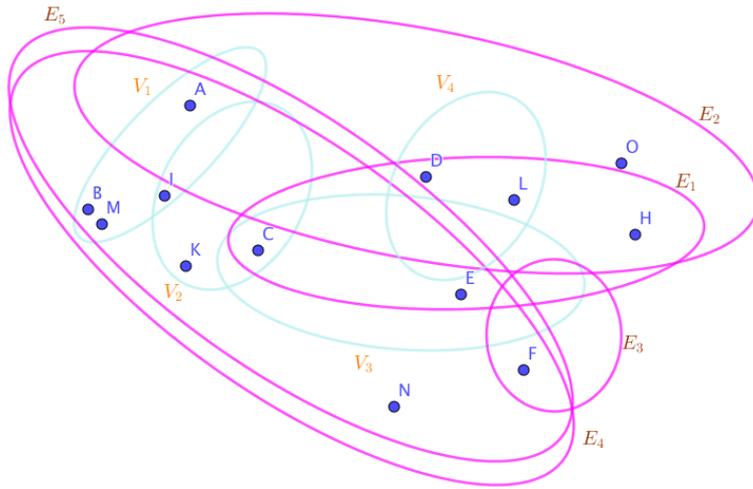


Figure 29.4: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= \\ 5 \times 3z^2. \end{aligned}$$

3986

- On the Figure (29.5), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 3987 3988

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= z. \end{aligned}$$

3989

- On the Figure (29.6), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 3990 3991

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} & \\ = \{E_{3i+1^3_{i=0}}, E_{3i+23^3_{i=0}}\}. & \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} & \\ = 3 \times 3z^8. & \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} & \\ = \{V_{3i+1^3_{i=0}}, V_{3i+11^3_{i=0}}\}. & \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-Quasi-SuperHyperDominating SuperHyperPolynomial}} & \end{aligned}$$

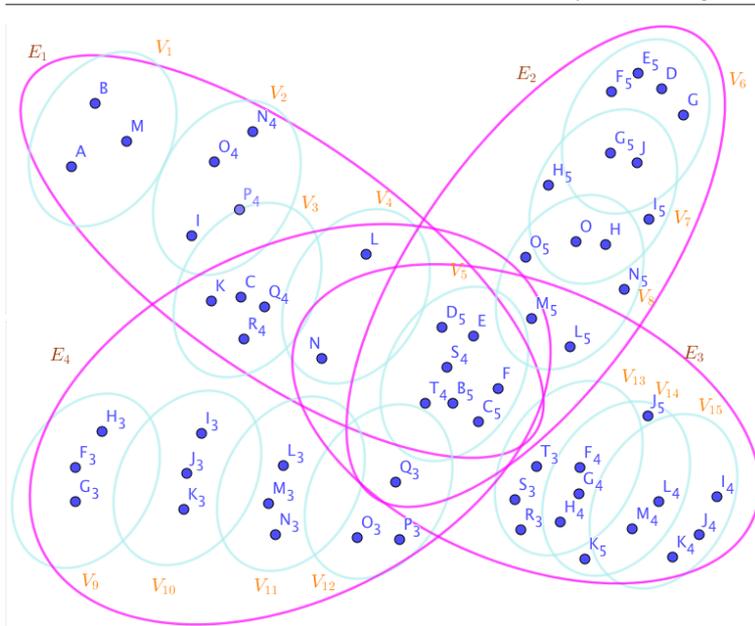


Figure 29.5: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG5

$$= 3 \times 3z^8.$$

3992

- On the Figure (29.7), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 3993 3994

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} = \{E_{15}, E_{16}, E_{17}\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} = 3 \times 3z^3.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} = \{V_3, V_6, V_8\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} = 4 \times 5 \times 5z^3.$$

3995

- On the Figure (29.8), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 3996 3997

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} = \{E_4\}.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} = z.$$

$$\mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} = \{V_3, V_6, V_8\}.$$

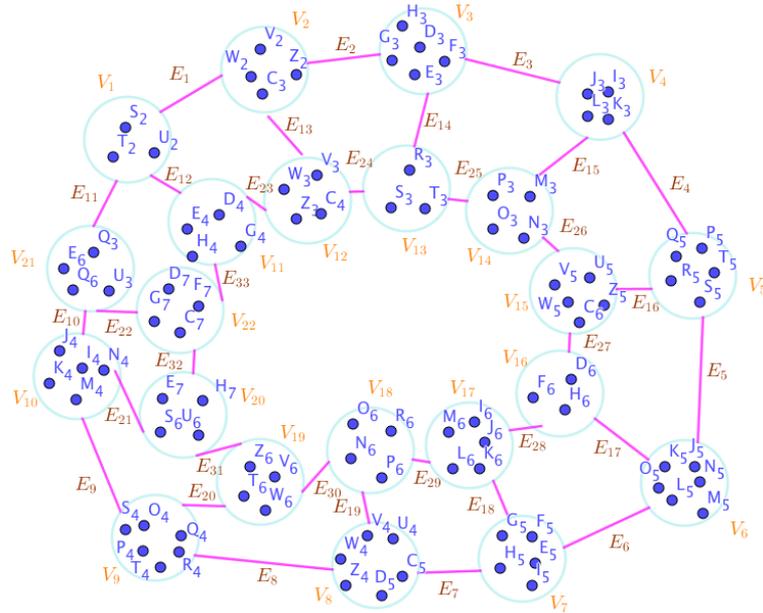


Figure 29.6: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG6

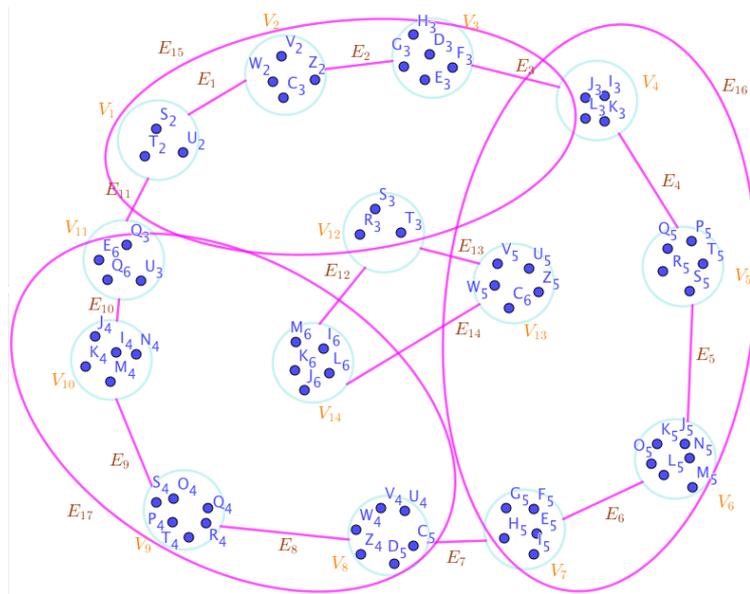


Figure 29.7: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG7

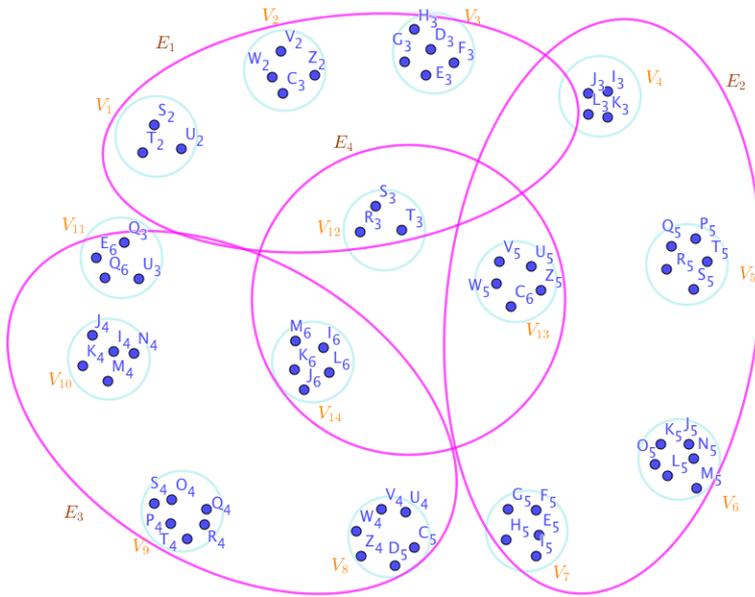


Figure 29.8: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG8

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= \\ &= 4 \times 5 \times 5z^3. \end{aligned}$$

3998

- On the Figure (29.9), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 3999 4000

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_{3i+1}_{i=0}, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_{3i+1}_{i=0}, V_{11}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-Quasi-SuperHyperDominating SuperHyperPolynomial}} &= 3 \times 11z^5. \end{aligned}$$

4001

- On the Figure (29.10), the Neutrosophic SuperHyperNotion, namely, Neutrosophic Super- 4002

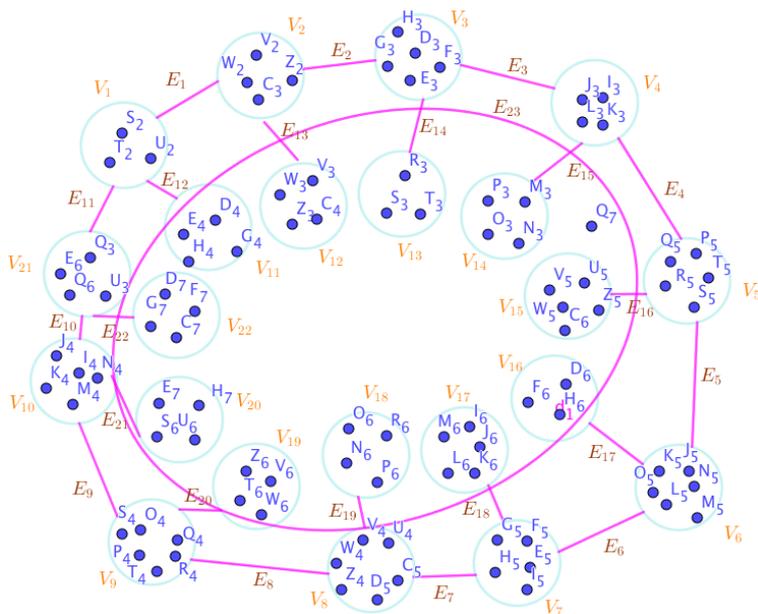


Figure 29.9: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG9

HyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4003

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 4 \times 5 \times 5z^3. \end{aligned}$$

4004

- On the Figure (29.11), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4005 4006

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 3 \times 3z^3. \end{aligned}$$

4007

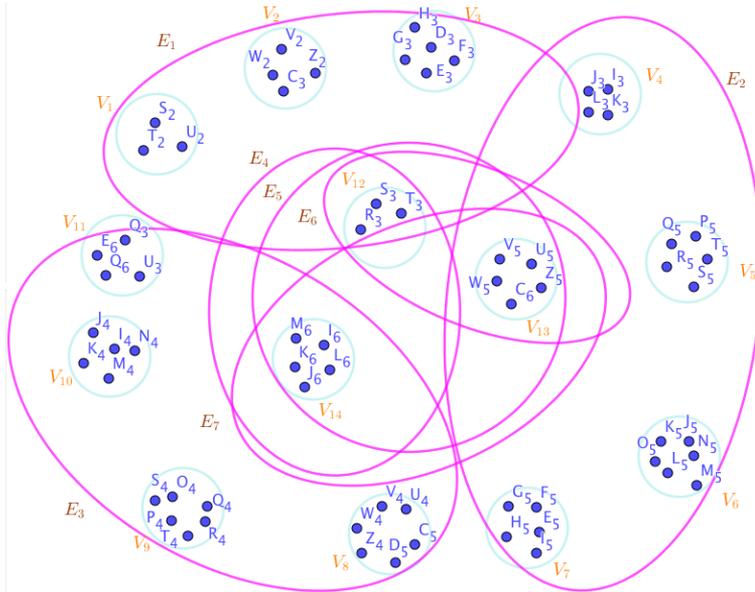


Figure 29.10: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG10

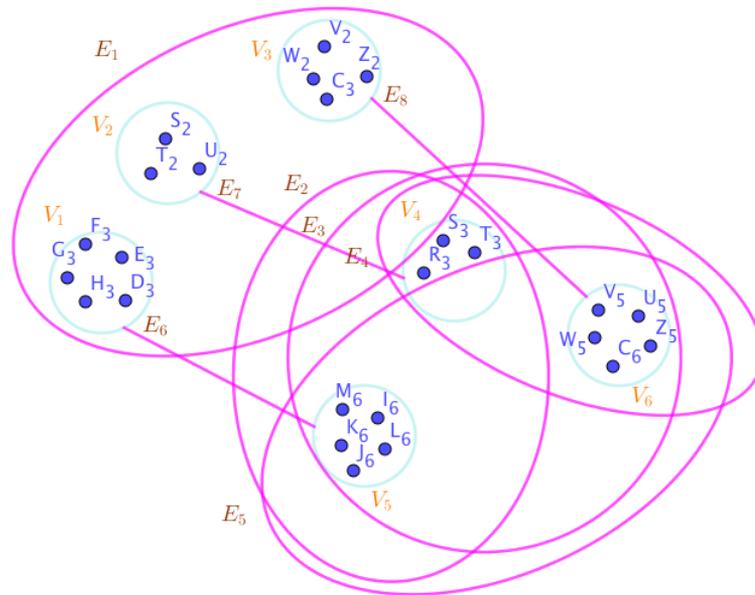


Figure 29.11: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG11

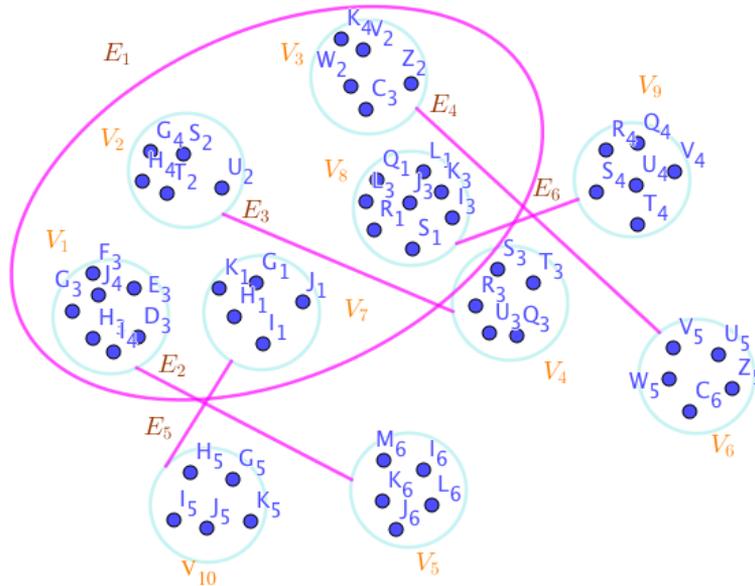


Figure 29.12: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG12

- On the Figure (29.12), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4008 4009

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_{i=1}^{i \neq 4,5,6}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= \\ &= 5 \times 5z^5. \end{aligned}$$

4010

- On the Figure (29.13), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4011 4012

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_3, E_9\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= \\ &= 3 \times 3z^2. \end{aligned}$$

4013

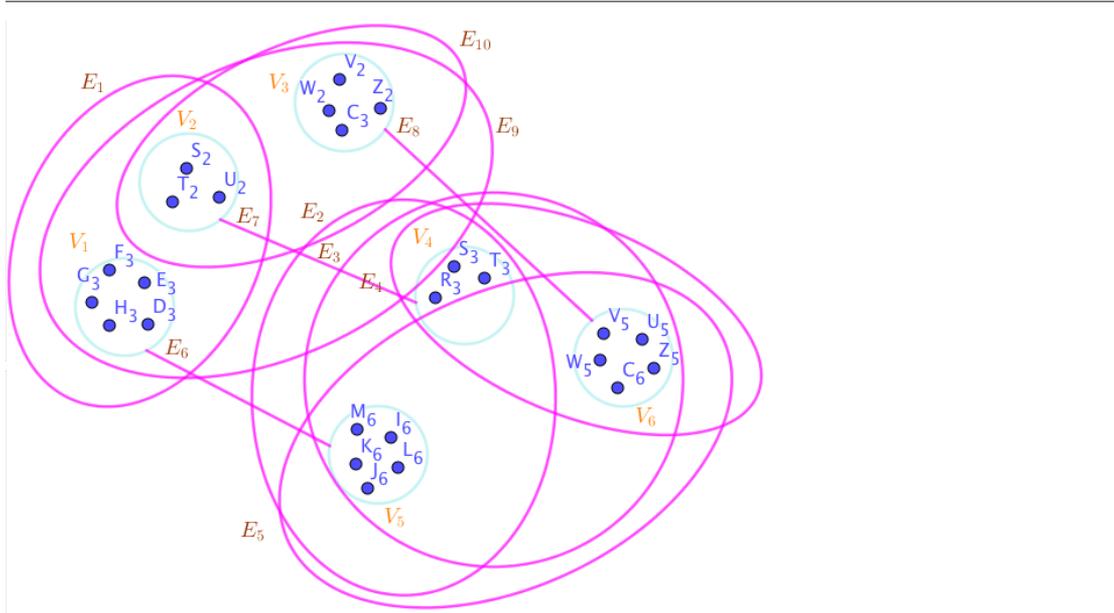


Figure 29.13: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG13

- On the Figure (29.14), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4014 4015

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= z. \end{aligned}$$

4016

- On the Figure (29.15), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4017 4018

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= z^2. \end{aligned}$$

4019

- On the Figure (29.16), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4020

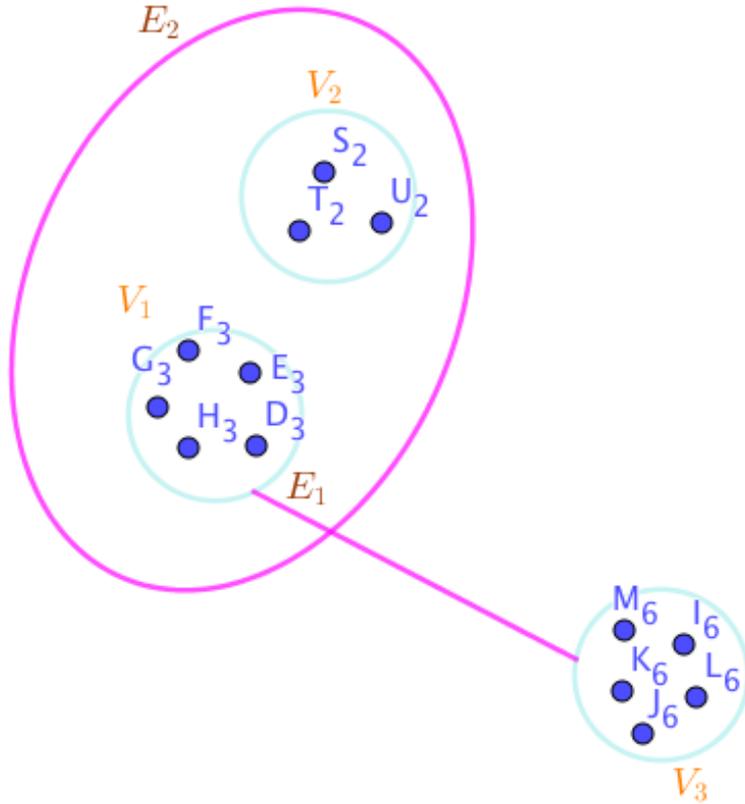


Figure 29.14: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG14

HyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4021

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 4 \times 3z^3. \end{aligned}$$

4022

- On the Figure (29.17), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4023  
4024

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 4z^2. \end{aligned}$$

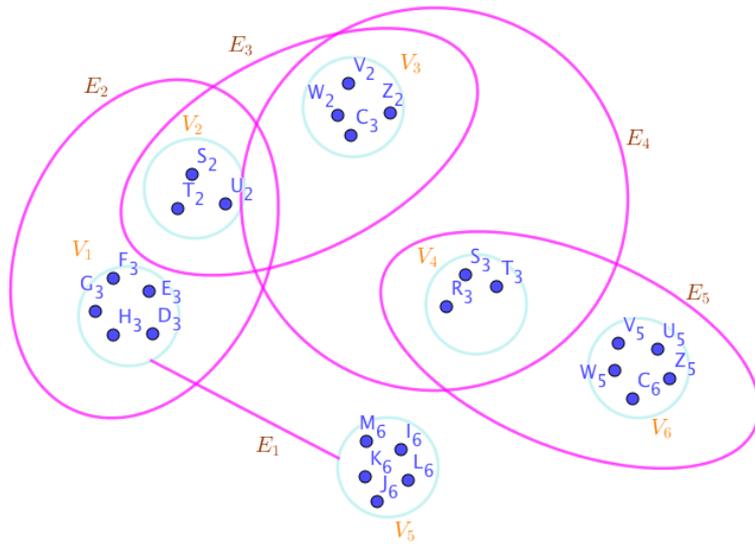


Figure 29.15: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG15

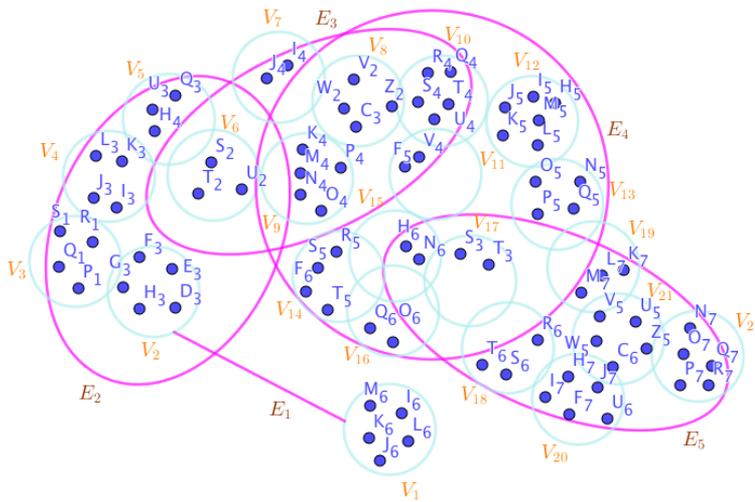


Figure 29.16: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG16

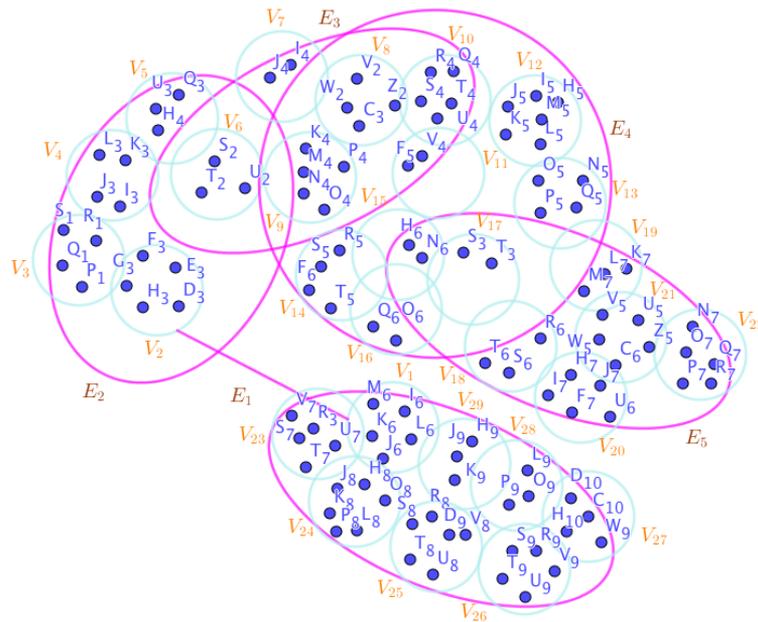


Figure 29.17: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG17

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 4 \times 3z^4. \end{aligned}$$

4025

- On the Figure (29.18), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4026 4027

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= 2 \times 4 \times 3z^4. \end{aligned}$$

4028

- On the Figure (29.19), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4029 4030

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_{3i+1_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= 3z^4. \end{aligned}$$

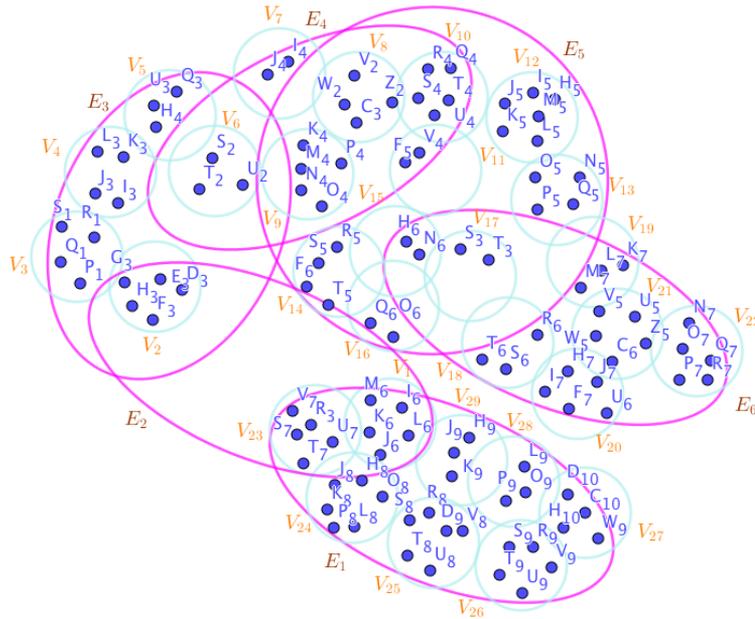


Figure 29.18: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG18

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 3z^4. \end{aligned}$$

4031

- On the Figure (29.20), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4032 4033

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperDominating SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme V-SuperHyperDominating SuperHyperPolynomial}} &= z. \end{aligned}$$

4034

- On the Figure (29.21), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDominating, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4035 4036

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} &= 10z. \end{aligned}$$



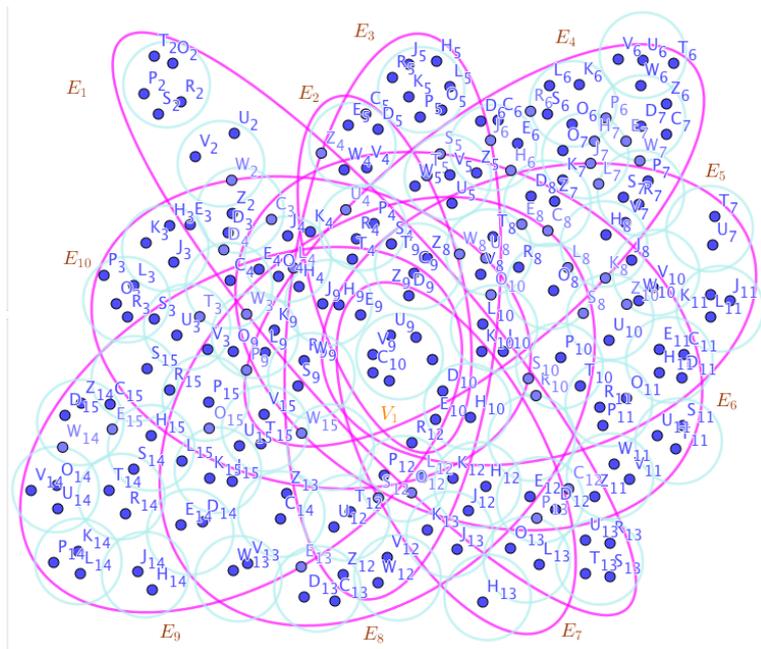


Figure 29.20: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

136NSHG20

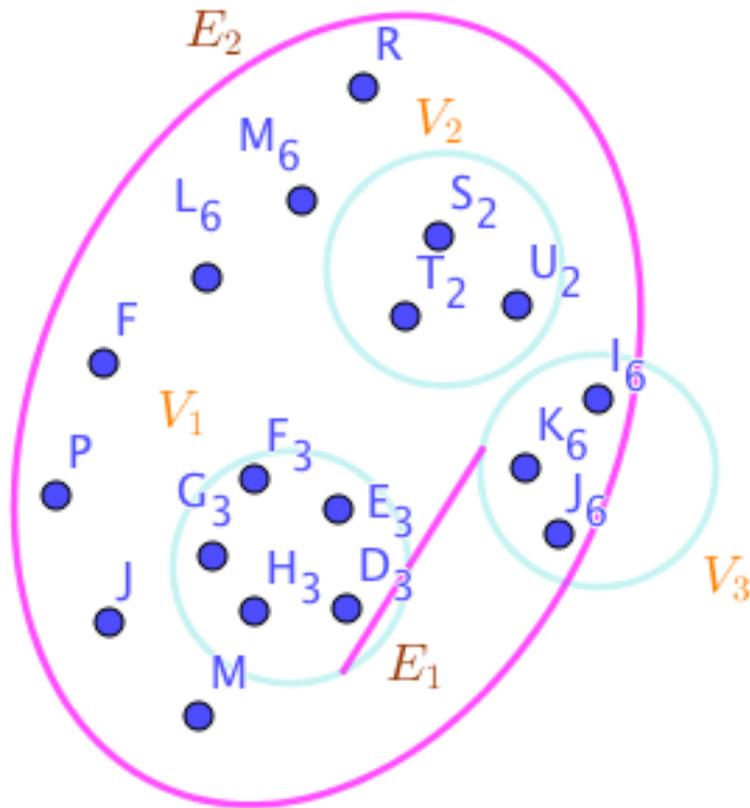


Figure 29.21: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

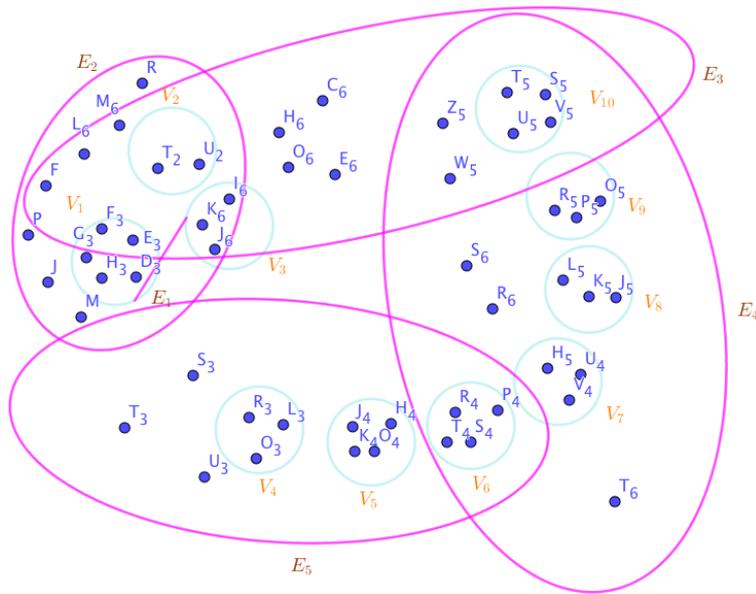


Figure 29.22: The Neutrosophic SuperHyperGraphs Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.3)

95NHG2



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# The Neutrosophic Departures on The Theoretical Results Toward Theoretical Motivations

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The previous Neutrosophic approach apply on the upcoming Neutrosophic results on Neutrosophic SuperHyperClasses. 4045  
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**Proposition 30.0.1.** Assume a connected Neutrosophic SuperHyperPath  $ESHG : (V, E)$ . Then 4047

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating} = \\
 & = \{E_{3i+1}\}_{i=0}^{\lfloor \frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3} \rfloor} . \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating\ SuperHyperPolynomial} \\
 & = 3z^{\lfloor \frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3} \rfloor} . \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating} \\
 & = \{V^{EXTERNAL}_{3i+1}\}_{i=0}^{\lfloor \frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3} \rfloor} . \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating\ SuperHyperPolynomial} \\
 & = \prod |V^{EXTERNAL}_{ESHG:(V,E)|_{Neutrosophic\ Cardinality}} 3z^{\lfloor \frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3} \rfloor} .
 \end{aligned}$$

*Proof.* Let 4048

$$\begin{aligned}
 & P : \\
 & V_2^{EXTERNAL}, E_2, \\
 & V_3^{EXTERNAL}, E_3, \\
 & \dots, \\
 & E_{\lfloor \frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3} \rfloor - 1}, V_{\lfloor \frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3} \rfloor}^{EXTERNAL}
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperPath  $ESHG : (V, E)$ . There's 4049

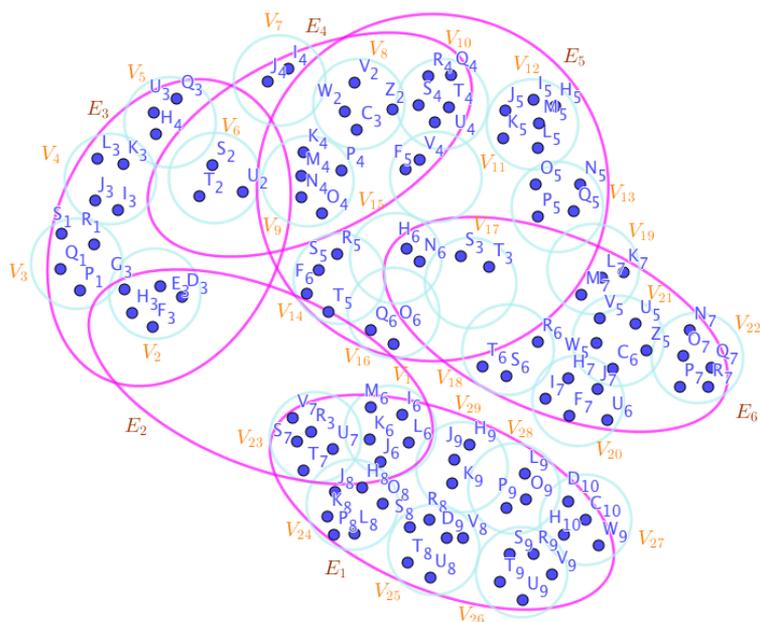


Figure 30.1: a Neutrosophic SuperHyperPath Associated to the Notions of Neutrosophic SuperHyperDominating in the Example (41.0.5)

136NSHG18a

a new way to redefine as

4050

$$\begin{aligned}
 V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. ■

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136EXM18a

**Example 30.0.2.** In the Figure (30.1), the connected Neutrosophic SuperHyperPath  $ESHHP : (V, E)$ , is highlighted and featured. The Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.1), is the SuperHyperDominating.

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4054  
4055

**Proposition 30.0.3.** Assume a connected Neutrosophic SuperHyperCycle  $ESHHC : (V, E)$ . Then

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$$\begin{aligned}
 \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating} &= \\
 = \{E_{3i+1}\}_{i=0}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3} \rfloor} & \\
 \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating\ SuperHyperPolynomial} & \\
 = 3z^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3} \rfloor} & \\
 \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating} &
 \end{aligned}$$

$$\begin{aligned}
 &= \{V^{EXTERNAL}_{3i+1}\}_{i=0}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3} \rfloor} \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating\ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} \mathfrak{Z}^{\lfloor \frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3} \rfloor}.
 \end{aligned}$$

*Proof.* Let

4057

$$\begin{aligned}
 &P : \\
 &V_2^{EXTERNAL}, E_2, \\
 &V_3^{EXTERNAL}, E_3, \\
 &\dots, \\
 &E_{\lfloor \frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3} \rfloor - 1}, V^{EXTERNAL}_{\lfloor \frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3} \rfloor}
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. ■

136EXM19a

**Example 30.0.4.** In the Figure (30.2), the connected Neutrosophic SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.2), is the Neutrosophic SuperHyperDominating.

**Proposition 30.0.5.** Assume a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . Then

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating} = \{E_i \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating\ SuperHyperPolynomial} \\
 &= |i| E_i \in |E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} \mathfrak{Z}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating\ SuperHyperPolynomial} = \mathfrak{Z}.
 \end{aligned}$$

*Proof.* Let

4066

$$P : V_i^{EXTERNAL}, E_i, CENTER, E_j.$$

be a longest path taken a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

4068

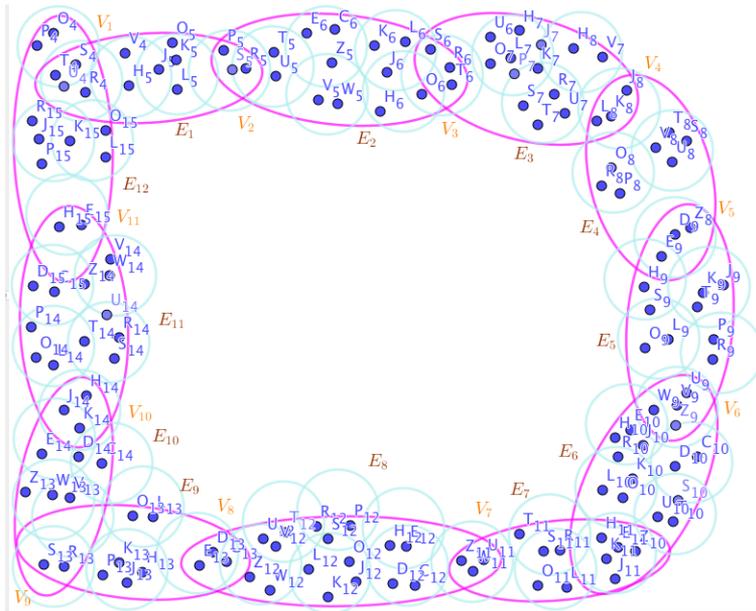


Figure 30.2: a Neutrosophic SuperHyperCycle Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.7)

136NSHG19a

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. ■

136EXM20a

**Example 30.0.6.** In the Figure (30.3), the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , in the Neutrosophic SuperHyperModel (30.3), is the Neutrosophic SuperHyperDominating.

**Proposition 30.0.7.** Assume a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} \end{aligned}$$

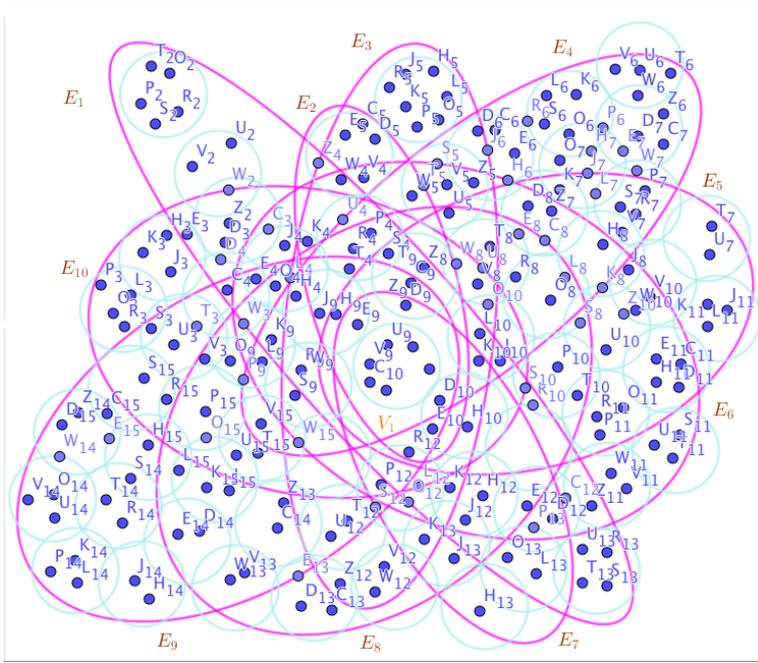


Figure 30.3: a Neutrosophic SuperHyperStar Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.9)

136NSHG20a

$$\begin{aligned}
 &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}}, i \neq j\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating\ SuperHyperPolynomial} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{Neutrosophic\ Cardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}|_{choose\ 2}) = z^2.
 \end{aligned}$$

Proof. Let

4078

$$\begin{aligned}
 P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ .  
There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. Then

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there's no at least one SuperHyperDominating. Thus the notion of quasi may be up but  
 the SuperHyperNotions based on SuperHyperDominating could be applied. There are only  
 two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the  
 representative in the

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperDominating taken from a connected Neutrosophic SuperHyperBipartite  
 $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-  
 SuperHyperPart SuperHyperEdges are attained in any solution

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

The latter is straightforward. ■ 4090

136EXM21a

**Example 30.0.8.** In the Neutrosophic Figure (30.4), the connected Neutrosophic SuperHyperBi-  
 partite  $ESHB : (V, E)$ , is Neutrosophic highlighted and Neutrosophic featured. The obtained  
 Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result,  
 of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite  
 $ESHB : (V, E)$ , in the Neutrosophic SuperHyperModel (30.4), is the Neutrosophic SuperHyper-  
 Dominating.

**Proposition 30.0.9.** Assume a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ .  
 Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating}} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDominating SuperHyperPolynomial}} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating}} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperDominating SuperHyperPolynomial}} \\ &= \sum_{\substack{V_{ESHG:(V,E)}^{EXTERNAL} \\ |Neutrosophic Cardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let 4099

$$P :$$



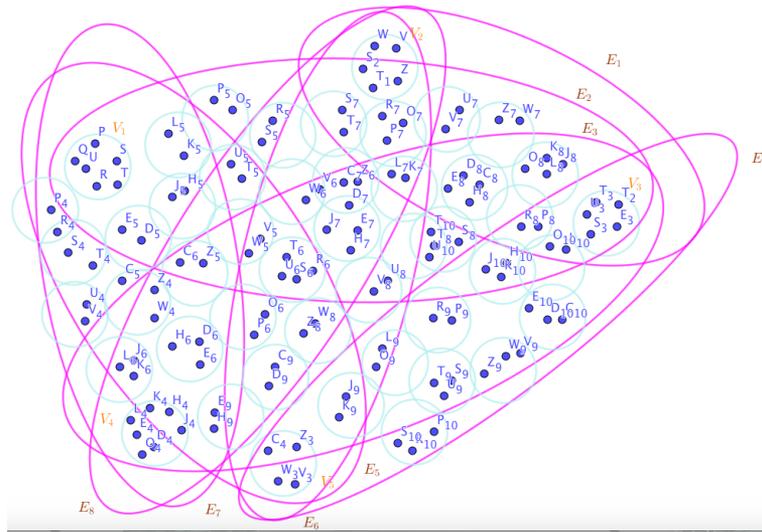


Figure 30.5: a Neutrosophic SuperHyperMultipartite Associated to the Notions of Neutrosophic SuperHyperDominating in the Example (41.0.13)

136NSHG22a

SuperHyperEdges are attained in any solution

4110

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ .  
 The latter is straightforward. ■

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136EXM22a

**Example 30.0.10.** In the Figure (30.5), the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (30.5), is the Neutrosophic SuperHyperDominating.

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**Proposition 30.0.11.** Assume a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . Then,

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$$\begin{aligned} \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating} &= \{E_i \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDominating\ SuperHyperPolynomial} \\ &= |i \mid E_i \in |E_{ESHG:(V,E)}^*|_{Neutrosophic\ Cardinality}|z. \\ \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperDominating\ SuperHyperPolynomial} &= z. \end{aligned}$$

*Proof.* Let

4120

$$P : V^{EXTERNAL}_i, E^*_i, CENTER, E_j.$$

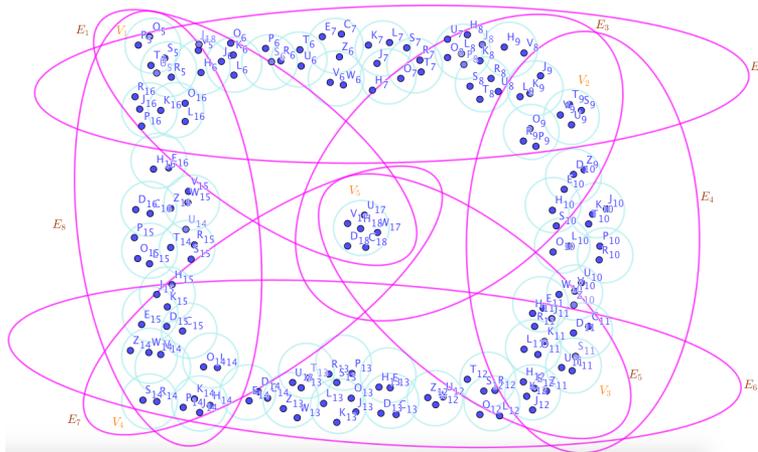


Figure 30.6: a Neutrosophic SuperHyperWheel Neutrosophic Associated to the Neutrosophic Notions of Neutrosophic SuperHyperDominating in the Neutrosophic Example (41.0.15)

136NSHG23a

is a longest SuperHyperDominating taken from a connected Neutrosophic SuperHyperWheel 4121  
*ESHW* : (*V*, *E*). There's a new way to redefine as 4122

$$\begin{aligned}
 V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded 4123  
 to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDominating. The latter is straightforward. 4124  
 Then there's at least one SuperHyperDominating. Thus the notion of quasi isn't up and the 4125  
 SuperHyperNotions based on SuperHyperDominating could be applied. The unique embedded 4126  
 SuperHyperDominating proposes some longest SuperHyperDominating excerpt from some 4127  
 representatives. The latter is straightforward. 4128

136EXM23a

**Example 30.0.12.** In the Neutrosophic Figure (30.6), the connected Neutrosophic SuperHyper- 4129  
 Wheel *NSHW* : (*V*, *E*), is Neutrosophic highlighted and featured. The obtained Neutrosophic 4130  
 SuperHyperSet, by the Algorithm in previous result, of the Neutrosophic SuperHyperVertices of 4131  
 the connected Neutrosophic SuperHyperWheel *ESHW* : (*V*, *E*), in the Neutrosophic SuperHy- 4132  
 perModel (30.6), is the Neutrosophic SuperHyperDominating. 4133



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## The Surveys of Mathematical Sets On The Results But As The Initial Motivation

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For the SuperHyperDominating, Neutrosophic SuperHyperDominating, and the Neutrosophic SuperHyperDominating, some general results are introduced. 4137  
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*Remark 31.0.1.* Let remind that the Neutrosophic SuperHyperDominating is “redefined” on the positions of the alphabets. 4139  
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**Corollary 31.0.2.** *Assume Neutrosophic SuperHyperDominating. Then* 4141

$$\begin{aligned} & \text{Neutrosophic SuperHyperDominating} = \\ & \{ \text{the SuperHyperDominating of the SuperHyperVertices} \mid \\ & \max \{ \text{SuperHyperOffensive} \\ & \text{SuperHyperDominating} \\ & \mid \text{Neutrosophic cardinality amid those SuperHyperDominating.} \} \end{aligned}$$

*plus one Neutrosophic SuperHyperNeighbor to one. Where  $\sigma_i$  is the unary operation on the SuperHyperVertices of the SuperHyperGraph to assign the determinacy, the indeterminacy and the neutrality, for  $i = 1, 2, 3$ , respectively.* 4142  
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**Corollary 31.0.3.** *Assume a Neutrosophic SuperHyperGraph on the same identical letter of the alphabet. Then the notion of Neutrosophic SuperHyperDominating and SuperHyperDominating coincide.* 4145  
4146  
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**Corollary 31.0.4.** *Assume a Neutrosophic SuperHyperGraph on the same identical letter of the alphabet. Then a consecutive sequence of the SuperHyperVertices is a Neutrosophic SuperHyperDominating if and only if it's a SuperHyperDominating.* 4148  
4149  
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**Corollary 31.0.5.** *Assume a Neutrosophic SuperHyperGraph on the same identical letter of the alphabet. Then a consecutive sequence of the SuperHyperVertices is a strongest SuperHyperDominating if and only if it's a longest SuperHyperDominating.* 4151  
4152  
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**Corollary 31.0.6.** *Assume SuperHyperClasses of a Neutrosophic SuperHyperGraph on the same identical letter of the alphabet. Then its Neutrosophic SuperHyperDominating is its SuperHyperDominating and reversely.* 4154  
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**Corollary 31.0.7.** Assume a Neutrosophic SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel) on the same identical letter of the alphabet. Then its Neutrosophic SuperHyperDominating is its SuperHyperDominating and reversely. 4157  
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**Corollary 31.0.8.** Assume a Neutrosophic SuperHyperGraph. Then its Neutrosophic SuperHyperDominating isn't well-defined if and only if its SuperHyperDominating isn't well-defined. 4161  
4162

**Corollary 31.0.9.** Assume SuperHyperClasses of a Neutrosophic SuperHyperGraph. Then its Neutrosophic SuperHyperDominating isn't well-defined if and only if its SuperHyperDominating isn't well-defined. 4163  
4164  
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**Corollary 31.0.10.** Assume a Neutrosophic SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). Then its Neutrosophic SuperHyperDominating isn't well-defined if and only if its SuperHyperDominating isn't well-defined. 4166  
4167  
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**Corollary 31.0.11.** Assume a Neutrosophic SuperHyperGraph. Then its Neutrosophic SuperHyperDominating is well-defined if and only if its SuperHyperDominating is well-defined. 4170  
4171

**Corollary 31.0.12.** Assume SuperHyperClasses of a Neutrosophic SuperHyperGraph. Then its Neutrosophic SuperHyperDominating is well-defined if and only if its SuperHyperDominating is well-defined. 4172  
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**Corollary 31.0.13.** Assume a Neutrosophic SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). Then its Neutrosophic SuperHyperDominating is well-defined if and only if its SuperHyperDominating is well-defined. 4175  
4176  
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**Proposition 31.0.14.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph. Then  $V$  is 4178

- (i) : the dual SuperHyperDefensive SuperHyperDominating; 4179
- (ii) : the strong dual SuperHyperDefensive SuperHyperDominating; 4180
- (iii) : the connected dual SuperHyperDefensive SuperHyperDominating; 4181
- (iv) : the  $\delta$ -dual SuperHyperDefensive SuperHyperDominating; 4182
- (v) : the strong  $\delta$ -dual SuperHyperDefensive SuperHyperDominating; 4183
- (vi) : the connected  $\delta$ -dual SuperHyperDefensive SuperHyperDominating. 4184

**Proposition 31.0.15.** Let  $NTG : (V, E, \sigma, \mu)$  be a Neutrosophic SuperHyperGraph. Then  $\emptyset$  is 4185

- (i) : the SuperHyperDefensive SuperHyperDominating; 4186
- (ii) : the strong SuperHyperDefensive SuperHyperDominating; 4187
- (iii) : the connected defensive SuperHyperDefensive SuperHyperDominating; 4188
- (iv) : the  $\delta$ -SuperHyperDefensive SuperHyperDominating; 4189
- (v) : the strong  $\delta$ -SuperHyperDefensive SuperHyperDominating; 4190

(vi) : the connected  $\delta$ -SuperHyperDefensive SuperHyperDominating. 4191

**Proposition 31.0.16.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph. Then an independent SuperHyperSet is 4192  
4193

(i) : the SuperHyperDefensive SuperHyperDominating; 4194

(ii) : the strong SuperHyperDefensive SuperHyperDominating; 4195

(iii) : the connected SuperHyperDefensive SuperHyperDominating; 4196

(iv) : the  $\delta$ -SuperHyperDefensive SuperHyperDominating; 4197

(v) : the strong  $\delta$ -SuperHyperDefensive SuperHyperDominating; 4198

(vi) : the connected  $\delta$ -SuperHyperDefensive SuperHyperDominating. 4199

**Proposition 31.0.17.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperUniform SuperHyper-Graph which is a SuperHyperDominating/SuperHyperPath. Then  $V$  is a maximal 4200  
4201

(i) : SuperHyperDefensive SuperHyperDominating; 4202

(ii) : strong SuperHyperDefensive SuperHyperDominating; 4203

(iii) : connected SuperHyperDefensive SuperHyperDominating; 4204

(iv) :  $\mathcal{O}(ESHG)$ -SuperHyperDefensive SuperHyperDominating; 4205

(v) : strong  $\mathcal{O}(ESHG)$ -SuperHyperDefensive SuperHyperDominating; 4206

(vi) : connected  $\mathcal{O}(ESHG)$ -SuperHyperDefensive SuperHyperDominating; 4207

Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 4208

**Proposition 31.0.18.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph which is a SuperHyperUniform SuperHyperWheel. Then  $V$  is a maximal 4209  
4210

(i) : dual SuperHyperDefensive SuperHyperDominating; 4211

(ii) : strong dual SuperHyperDefensive SuperHyperDominating; 4212

(iii) : connected dual SuperHyperDefensive SuperHyperDominating; 4213

(iv) :  $\mathcal{O}(ESHG)$ -dual SuperHyperDefensive SuperHyperDominating; 4214

(v) : strong  $\mathcal{O}(ESHG)$ -dual SuperHyperDefensive SuperHyperDominating; 4215

(vi) : connected  $\mathcal{O}(ESHG)$ -dual SuperHyperDefensive SuperHyperDominating; 4216

Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 4217

**Proposition 31.0.19.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperUniform SuperHyper-Graph which is a SuperHyperDominating/SuperHyperPath. Then the number of 4218  
4219

(i) : the SuperHyperDominating; 4220

- (ii) : the SuperHyperDominating; 4221
- (iii) : the connected SuperHyperDominating; 4222
- (iv) : the  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 4223
- (v) : the strong  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 4224
- (vi) : the connected  $\mathcal{O}(ESHG)$ -SuperHyperDominating. 4225

is one and it's only  $V$ . Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 4226  
4227

**Proposition 31.0.20.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperUniform SuperHyper-Graph which is a SuperHyperWheel. Then the number of 4228  
4229

- (i) : the dual SuperHyperDominating; 4230
- (ii) : the dual SuperHyperDominating; 4231
- (iii) : the dual connected SuperHyperDominating; 4232
- (iv) : the dual  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 4233
- (v) : the strong dual  $\mathcal{O}(ESHG)$ -SuperHyperDominating; 4234
- (vi) : the connected dual  $\mathcal{O}(ESHG)$ -SuperHyperDominating. 4235

is one and it's only  $V$ . Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide. 4236  
4237

**Proposition 31.0.21.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperUniform SuperHyper-Graph which is a SuperHyperStar/SuperHyperComplete SuperHyperBipartite/SuperHyperComplete SuperHyperMultipartite. Then a SuperHyperSet contains [the SuperHyperCenter and] the half of multiplying  $r$  with the number of all the SuperHyperEdges plus one of all the SuperHyperVertices is a 4238  
4239  
4240  
4241  
4242

- (i) : dual SuperHyperDefensive SuperHyperDominating; 4243
- (ii) : strong dual SuperHyperDefensive SuperHyperDominating; 4244
- (iii) : connected dual SuperHyperDefensive SuperHyperDominating; 4245
- (iv) :  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating; 4246
- (v) : strong  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating; 4247
- (vi) : connected  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating. 4248

**Proposition 31.0.22.** Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperUniform SuperHyper-Graph which is a SuperHyperStar/SuperHyperComplete SuperHyperBipartite/SuperHyperComplete SuperHyperMultipartite. Then a SuperHyperSet contains the half of multiplying  $r$  with the number of all the SuperHyperEdges plus one of all the SuperHyperVertices in the biggest SuperHyperPart is a 4249  
4250  
4251  
4252  
4253

- (i) : *SuperHyperDefensive SuperHyperDominating;* 4254
- (ii) : *strong SuperHyperDefensive SuperHyperDominating;* 4255
- (iii) : *connected SuperHyperDefensive SuperHyperDominating;* 4256
- (iv) :  *$\delta$ -SuperHyperDefensive SuperHyperDominating;* 4257
- (v) : *strong  $\delta$ -SuperHyperDefensive SuperHyperDominating;* 4258
- (vi) : *connected  $\delta$ -SuperHyperDefensive SuperHyperDominating.* 4259

**Proposition 31.0.23.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperUniform SuperHyper-Graph which is a SuperHyperStar/SuperHyperComplete SuperHyperBipartite/SuperHyperComplete SuperHyperMultipartite. Then the number of* 4260  
4261  
4262

- (i) : *dual SuperHyperDefensive SuperHyperDominating;* 4263
- (ii) : *strong dual SuperHyperDefensive SuperHyperDominating;* 4264
- (iii) : *connected dual SuperHyperDefensive SuperHyperDominating;* 4265
- (iv) :  *$\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating;* 4266
- (v) : *strong  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating;* 4267
- (vi) : *connected  $\frac{\mathcal{O}(ESHG)}{2} + 1$ -dual SuperHyperDefensive SuperHyperDominating.* 4268

*is one and it's only  $S$ , a SuperHyperSet contains [the SuperHyperCenter and] the half of multiplying  $r$  with the number of all the SuperHyperEdges plus one of all the SuperHyperVertices. Where the exterior SuperHyperVertices and the interior SuperHyperVertices coincide.* 4269  
4270  
4271

**Proposition 31.0.24.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph. The number of connected component is  $|V - S|$  if there's a SuperHyperSet which is a dual* 4272  
4273

- (i) : *SuperHyperDefensive SuperHyperDominating;* 4274
- (ii) : *strong SuperHyperDefensive SuperHyperDominating;* 4275
- (iii) : *connected SuperHyperDefensive SuperHyperDominating;* 4276
- (iv) : *SuperHyperDominating;* 4277
- (v) : *strong 1-SuperHyperDefensive SuperHyperDominating;* 4278
- (vi) : *connected 1-SuperHyperDefensive SuperHyperDominating.* 4279

**Proposition 31.0.25.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph. Then the number is at most  $\mathcal{O}(ESHG)$  and the Neutrosophic number is at most  $\mathcal{O}_n(ESHG)$ .* 4280  
4281

**Proposition 31.0.26.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph which is SuperHyperComplete. The number is  $\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1$  and the Neutrosophic number is  $\min \sum_{v \in \{v_1, v_2, \dots, v_t\}} \mathcal{O}(ESHG:(V,E)) \subseteq V \sigma(v)$ , in the setting of dual* 4282  
4283  
4284

- (i) : *SuperHyperDefensive SuperHyperDominating;* 4285
- (ii) : *strong SuperHyperDefensive SuperHyperDominating;* 4286
- (iii) : *connected SuperHyperDefensive SuperHyperDominating;* 4287
- (iv) :  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating;* 4288
- (v) : *strong*  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating;* 4289
- (vi) : *connected*  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating.* 4290

**Proposition 31.0.27.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph which is  $\emptyset$ . The number is 0 and the Neutrosophic number is 0, for an independent SuperHyperSet in the setting of dual* 4291  
 4292  
 4293

- (i) : *SuperHyperDefensive SuperHyperDominating;* 4294
- (ii) : *strong SuperHyperDefensive SuperHyperDominating;* 4295
- (iii) : *connected SuperHyperDefensive SuperHyperDominating;* 4296
- (iv) : *0-SuperHyperDefensive SuperHyperDominating;* 4297
- (v) : *strong 0-SuperHyperDefensive SuperHyperDominating;* 4298
- (vi) : *connected 0-SuperHyperDefensive SuperHyperDominating.* 4299

**Proposition 31.0.28.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph which is SuperHyperComplete. Then there's no independent SuperHyperSet.* 4300  
 4301

**Proposition 31.0.29.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph which is SuperHyperDominating/SuperHyperPath/SuperHyperWheel. The number is  $\mathcal{O}(ESHG : (V, E))$  and the Neutrosophic number is  $\mathcal{O}_n(ESHG : (V, E))$ , in the setting of a dual* 4302  
 4303  
 4304

- (i) : *SuperHyperDefensive SuperHyperDominating;* 4305
- (ii) : *strong SuperHyperDefensive SuperHyperDominating;* 4306
- (iii) : *connected SuperHyperDefensive SuperHyperDominating;* 4307
- (iv) :  $\mathcal{O}(ESHG : (V, E))$ -*SuperHyperDefensive SuperHyperDominating;* 4308
- (v) : *strong*  $\mathcal{O}(ESHG : (V, E))$ -*SuperHyperDefensive SuperHyperDominating;* 4309
- (vi) : *connected*  $\mathcal{O}(ESHG : (V, E))$ -*SuperHyperDefensive SuperHyperDominating.* 4310

**Proposition 31.0.30.** *Let  $ESHG : (V, E)$  be a Neutrosophic SuperHyperGraph which is SuperHyperStar/complete SuperHyperBipartite/complete SuperHyperMultiPartite. The number is  $\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1$  and the Neutrosophic number is  $\min_{v \in \{v_1, v_2, \dots, v_t\}} \sum_{t > \frac{\mathcal{O}(ESHG:(V,E))}{2}} \subseteq V \sigma(v)$ , in the setting of a dual* 4311  
 4312  
 4313  
 4314

- (i) : *SuperHyperDefensive SuperHyperDominating;* 4315

(ii) : *strong SuperHyperDefensive SuperHyperDominating;* 4316

(iii) : *connected SuperHyperDefensive SuperHyperDominating;* 4317

(iv) :  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating;* 4318

(v) : *strong*  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating;* 4319

(vi) : *connected*  $(\frac{\mathcal{O}(ESHG:(V,E))}{2} + 1)$ -*SuperHyperDefensive SuperHyperDominating.* 4320

**Proposition 31.0.31.** *Let  $\mathcal{NSHF} : (V, E)$  be a SuperHyperFamily of the ESHGs :  $(V, E)$  Neutrosophic SuperHyperGraphs which are from one-type SuperHyperClass which the result is obtained for the individuals. Then the results also hold for the SuperHyperFamily  $\mathcal{NSHF} : (V, E)$  of these specific SuperHyperClasses of the Neutrosophic SuperHyperGraphs.* 4321  
4322  
4323  
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**Proposition 31.0.32.** *Let  $ESHG : (V, E)$  be a strong Neutrosophic SuperHyperGraph. If  $S$  is a dual SuperHyperDefensive SuperHyperDominating, then  $\forall v \in V \setminus S, \exists x \in S$  such that* 4325  
4326

(i)  $v \in N_s(x)$ ; 4327

(ii)  $vx \in E$ . 4328

**Proposition 31.0.33.** *Let  $ESHG : (V, E)$  be a strong Neutrosophic SuperHyperGraph. If  $S$  is a dual SuperHyperDefensive SuperHyperDominating, then* 4329  
4330

(i)  $S$  is SuperHyperDominating set; 4331

(ii) there's  $S \subseteq S'$  such that  $|S'|$  is SuperHyperChromatic number. 4332

**Proposition 31.0.34.** *Let  $ESHG : (V, E)$  be a strong Neutrosophic SuperHyperGraph. Then* 4333

(i)  $\Gamma \leq \mathcal{O}$ ; 4334

(ii)  $\Gamma_s \leq \mathcal{O}_n$ . 4335

**Proposition 31.0.35.** *Let  $ESHG : (V, E)$  be a strong Neutrosophic SuperHyperGraph which is connected. Then* 4336  
4337

(i)  $\Gamma \leq \mathcal{O} - 1$ ; 4338

(ii)  $\Gamma_s \leq \mathcal{O}_n - \sum_{i=1}^3 \sigma_i(x)$ . 4339

**Proposition 31.0.36.** *Let  $ESHG : (V, E)$  be an odd SuperHyperPath. Then* 4340

(i) the SuperHyperSet  $S = \{v_2, v_4, \dots, v_{n-1}\}$  is a dual SuperHyperDefensive SuperHyperDominating; 4341  
4342

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$  and corresponded SuperHyperSet is  $S = \{v_2, v_4, \dots, v_{n-1}\}$ ; 4343

(iii)  $\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s)\}$ ; 4344

(iv) the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_{n-1}\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only a dual SuperHyperDominating. 4345  
4346

**Proposition 31.0.37.** *Let  $ESHG : (V, E)$  be an even SuperHyperPath. Then* 4347

- (i) *the set  $S = \{v_2, v_4, \dots, v_n\}$  is a dual SuperHyperDefensive SuperHyperDominating;* 4348
- (ii)  *$\Gamma = \lfloor \frac{n}{2} \rfloor$  and corresponded SuperHyperSets are  $\{v_2, v_4, \dots, v_n\}$  and  $\{v_1, v_3, \dots, v_{n-1}\}$ ;* 4349
- (iii)  *$\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_n\}} \sum_{i=1}^3 \sigma_i(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s)\}$ ;* 4350
- (iv) *the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_n\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only dual SuperHyperDominating.* 4351  
4352

**Proposition 31.0.38.** *Let  $ESHG : (V, E)$  be an even SuperHyperDominating. Then* 4353

- (i) *the SuperHyperSet  $S = \{v_2, v_4, \dots, v_n\}$  is a dual SuperHyperDefensive SuperHyperDominating;* 4354  
4355
- (ii)  *$\Gamma = \lfloor \frac{n}{2} \rfloor$  and corresponded SuperHyperSets are  $\{v_2, v_4, \dots, v_n\}$  and  $\{v_1, v_3, \dots, v_{n-1}\}$ ;* 4356
- (iii)  *$\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_n\}} \sigma(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sigma(s)\}$ ;* 4357
- (iv) *the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_n\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only dual SuperHyperDominating.* 4358  
4359

**Proposition 31.0.39.** *Let  $ESHG : (V, E)$  be an odd SuperHyperDominating. Then* 4360

- (i) *the SuperHyperSet  $S = \{v_2, v_4, \dots, v_{n-1}\}$  is a dual SuperHyperDefensive SuperHyperDominating;* 4361  
4362
- (ii)  *$\Gamma = \lfloor \frac{n}{2} \rfloor + 1$  and corresponded SuperHyperSet is  $S = \{v_2, v_4, \dots, v_{n-1}\}$ ;* 4363
- (iii)  *$\Gamma_s = \min\{\sum_{s \in S = \{v_2, v_4, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s), \sum_{s \in S = \{v_1, v_3, \dots, v_{n-1}\}} \sum_{i=1}^3 \sigma_i(s)\}$ ;* 4364
- (iv) *the SuperHyperSets  $S_1 = \{v_2, v_4, \dots, v_{n-1}\}$  and  $S_2 = \{v_1, v_3, \dots, v_{n-1}\}$  are only dual SuperHyperDominating.* 4365  
4366

**Proposition 31.0.40.** *Let  $ESHG : (V, E)$  be SuperHyperStar. Then* 4367

- (i) *the SuperHyperSet  $S = \{c\}$  is a dual maximal SuperHyperDominating;* 4368
- (ii)  *$\Gamma = 1$ ;* 4369
- (iii)  *$\Gamma_s = \sum_{i=1}^3 \sigma_i(c)$ ;* 4370
- (iv) *the SuperHyperSets  $S = \{c\}$  and  $S \subset S'$  are only dual SuperHyperDominating.* 4371

**Proposition 31.0.41.** *Let  $ESHG : (V, E)$  be SuperHyperWheel. Then* 4372

- (i) *the SuperHyperSet  $S = \{v_1, v_3\} \cup \{v_6, v_9, \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}$  is a dual maximal SuperHyperDefensive SuperHyperDominating;* 4373  
4374
- (ii)  *$\Gamma = |\{v_1, v_3\} \cup \{v_6, v_9, \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}|$ ;* 4375
- (iii)  *$\Gamma_s = \sum_{\{v_1, v_3\} \cup \{v_6, v_9, \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}} \sum_{i=1}^3 \sigma_i(s)$ ;* 4376

(iv) the SuperHyperSet  $\{v_1, v_3\} \cup \{v_6, v_9, \dots, v_{i+6}, \dots, v_n\}_{i=1}^{6+3(i-1) \leq n}$  is only a dual maximal SuperHyperDefensive SuperHyperDominating. 4377  
4378

**Proposition 31.0.42.** Let  $ESHG : (V, E)$  be an odd SuperHyperComplete. Then 4379

(i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  is a dual SuperHyperDefensive SuperHyperDominating; 4380

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$ ; 4381

(iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}}$ ; 4382

(iv) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  is only a dual SuperHyperDefensive SuperHyperDominating. 4383  
4384

**Proposition 31.0.43.** Let  $ESHG : (V, E)$  be an even SuperHyperComplete. Then 4385

(i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  is a dual SuperHyperDefensive SuperHyperDominating; 4386

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor$ ; 4387

(iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}}$ ; 4388

(iv) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  is only a dual maximal SuperHyperDefensive SuperHyperDominating. 4389  
4390

**Proposition 31.0.44.** Let  $\mathcal{NSHF} : (V, E)$  be a  $m$ -SuperHyperFamily of Neutrosophic SuperHyperStars with common Neutrosophic SuperHyperVertex SuperHyperSet. Then 4391  
4392

(i) the SuperHyperSet  $S = \{c_1, c_2, \dots, c_m\}$  is a dual SuperHyperDefensive SuperHyperDominating for  $\mathcal{NSHF}$ ; 4393  
4394

(ii)  $\Gamma = m$  for  $\mathcal{NSHF} : (V, E)$ ; 4395

(iii)  $\Gamma_s = \sum_{i=1}^m \sum_{j=1}^3 \sigma_j(c_i)$  for  $\mathcal{NSHF} : (V, E)$ ; 4396

(iv) the SuperHyperSets  $S = \{c_1, c_2, \dots, c_m\}$  and  $S \subset S'$  are only dual SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ . 4397  
4398

**Proposition 31.0.45.** Let  $\mathcal{NSHF} : (V, E)$  be an  $m$ -SuperHyperFamily of odd SuperHyperComplete SuperHyperGraphs with common Neutrosophic SuperHyperVertex SuperHyperSet. Then 4399  
4400

(i) the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  is a dual maximal SuperHyperDefensive SuperHyperDominating for  $\mathcal{NSHF}$ ; 4401  
4402

(ii)  $\Gamma = \lfloor \frac{n}{2} \rfloor + 1$  for  $\mathcal{NSHF} : (V, E)$ ; 4403

(iii)  $\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}}$  for  $\mathcal{NSHF} : (V, E)$ ; 4404

(iv) the SuperHyperSets  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor + 1}$  are only a dual maximal SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ . 4405  
4406

**Proposition 31.0.46.** *Let  $\mathcal{NSHF} : (V, E)$  be a  $m$ -SuperHyperFamily of even SuperHyperComplete SuperHyperGraphs with common Neutrosophic SuperHyperVertex SuperHyperSet. Then* 4407  
 4408

- (i) *the SuperHyperSet  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  is a dual SuperHyperDefensive SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ ;* 4409  
 4410
- (ii)  *$\Gamma = \lfloor \frac{n}{2} \rfloor$  for  $\mathcal{NSHF} : (V, E)$ ;* 4411
- (iii)  *$\Gamma_s = \min\{\sum_{s \in S} \sum_{i=1}^3 \sigma_i(s)\}_{S=\{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}}$  for  $\mathcal{NSHF} : (V, E)$ ;* 4412
- (iv) *the SuperHyperSets  $S = \{v_i\}_{i=1}^{\lfloor \frac{n}{2} \rfloor}$  are only dual maximal SuperHyperDominating for  $\mathcal{NSHF} : (V, E)$ .* 4413  
 4414

**Proposition 31.0.47.** *Let  $ESHG : (V, E)$  be a strong Neutrosophic SuperHyperGraph. Then* 4415  
*following statements hold;* 4416

- (i) *if  $s \geq t$  and a SuperHyperSet  $S$  of SuperHyperVertices is an  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is an  $s$ -SuperHyperDefensive SuperHyperDominating;* 4417  
 4418
- (ii) *if  $s \leq t$  and a SuperHyperSet  $S$  of SuperHyperVertices is a dual  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is a dual  $s$ -SuperHyperDefensive SuperHyperDominating.* 4419  
 4420

**Proposition 31.0.48.** *Let  $ESHG : (V, E)$  be a strong Neutrosophic SuperHyperGraph. Then* 4421  
*following statements hold;* 4422

- (i) *if  $s \geq t + 2$  and a SuperHyperSet  $S$  of SuperHyperVertices is an  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is an  $s$ -SuperHyperPowerful SuperHyperDominating;* 4423  
 4424
- (ii) *if  $s \leq t$  and a SuperHyperSet  $S$  of SuperHyperVertices is a dual  $t$ -SuperHyperDefensive SuperHyperDominating, then  $S$  is a dual  $s$ -SuperHyperPowerful SuperHyperDominating.* 4425  
 4426

**Proposition 31.0.49.** *Let  $ESHG : (V, E)$  be a  $[an]$   $[V-]$ SuperHyperUniform-strong-Neutrosophic SuperHyperGraph. Then following statements hold;* 4427  
 4428

- (i) *if  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{r}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating;* 4429  
 4430
- (ii) *if  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{r}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating;* 4431  
 4432
- (iii) *if  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is an  $V$ -SuperHyperDefensive SuperHyperDominating;* 4433  
 4434
- (iv) *if  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is a dual  $V$ -SuperHyperDefensive SuperHyperDominating.* 4435  
 4436

**Proposition 31.0.50.** *Let  $ESHG : (V, E)$  is a  $[an]$   $[V-]$ SuperHyperUniform-strong-Neutrosophic SuperHyperGraph. Then following statements hold;* 4437  
 4438

- (i)  *$\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{r}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating;* 4439  
 4440

(ii)  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{r}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 4441  
4442

(iii)  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is an  $V$ -SuperHyperDefensive SuperHyperDominating; 4443  
4444

(iv)  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is a dual  $V$ -SuperHyperDefensive SuperHyperDominating. 4445  
4446

**Proposition 31.0.51.** Let  $ESHG : (V, E)$  is a[an]  $[V-]$ SuperHyperUniform-strong-Neutrosophic SuperHyperGraph which is a SuperHyperComplete. Then following statements hold; 4447  
4448

(i)  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 4449  
4450

(ii)  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 4451  
4452

(iii)  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is an  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating; 4453  
4454

(iv)  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is a dual  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating. 4455  
4456

**Proposition 31.0.52.** Let  $ESHG : (V, E)$  is a[an]  $[V-]$ SuperHyperUniform-strong-Neutrosophic SuperHyperGraph which is a SuperHyperComplete. Then following statements hold; 4457  
4458

(i) if  $\forall a \in S, |N_s(a) \cap S| < \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 4459  
4460

(ii) if  $\forall a \in V \setminus S, |N_s(a) \cap S| > \lfloor \frac{\mathcal{O}-1}{2} \rfloor + 1$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 4461  
4462

(iii) if  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating; 4463  
4464

(iv) if  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is a dual  $(\mathcal{O} - 1)$ -SuperHyperDefensive SuperHyperDominating. 4465  
4466

**Proposition 31.0.53.** Let  $ESHG : (V, E)$  is a[an]  $[V-]$ SuperHyperUniform-strong-Neutrosophic SuperHyperGraph which is SuperHyperDominating. Then following statements hold; 4467  
4468

(i)  $\forall a \in S, |N_s(a) \cap S| < 2$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 4469  
4470

(ii)  $\forall a \in V \setminus S, |N_s(a) \cap S| > 2$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating; 4471  
4472

(iii)  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating; 4473  
4474

(iv)  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$  if  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating. 4475  
4476

**Proposition 31.0.54.** *Let  $ESHG : (V, E)$  is a[an] [V-]SuperHyperUniform-strong-Neutrosophic SuperHyperGraph which is SuperHyperDominating. Then following statements hold;* 4477  
4478

- (i) *if  $\forall a \in S, |N_s(a) \cap S| < 2$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating;* 4479  
4480
- (ii) *if  $\forall a \in V \setminus S, |N_s(a) \cap S| > 2$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating;* 4481  
4482
- (iii) *if  $\forall a \in S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is an 2-SuperHyperDefensive SuperHyperDominating;* 4483  
4484
- (iv) *if  $\forall a \in V \setminus S, |N_s(a) \cap V \setminus S| = 0$ , then  $ESHG : (V, E)$  is a dual 2-SuperHyperDefensive SuperHyperDominating.* 4485  
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## Neutrosophic Applications in Cancer's Neutrosophic Recognition

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The cancer is the Neutrosophic disease but the Neutrosophic model is going to figure out what's going on this Neutrosophic phenomenon. The special Neutrosophic case of this Neutrosophic disease is considered and as the consequences of the model, some parameters are used. The cells are under attack of this disease but the moves of the cancer in the special region are the matter of mind. The Neutrosophic recognition of the cancer could help to find some Neutrosophic treatments for this Neutrosophic disease.

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In the following, some Neutrosophic steps are Neutrosophic devised on this disease.

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**Step 1. (Neutrosophic Definition)** The Neutrosophic recognition of the cancer in the long-term Neutrosophic function.

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**Step 2. (Neutrosophic Issue)** The specific region has been assigned by the Neutrosophic model [it's called Neutrosophic SuperHyperGraph] and the long Neutrosophic cycle of the move from the cancer is identified by this research. Sometimes the move of the cancer hasn't be easily identified since there are some determinacy, indeterminacy and neutrality about the moves and the effects of the cancer on that region; this event leads us to choose another model [it's said to be Neutrosophic SuperHyperGraph] to have convenient perception on what's happened and what's done.

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**Step 3. (Neutrosophic Model)** There are some specific Neutrosophic models, which are well-known and they've got the names, and some general Neutrosophic models. The moves and the Neutrosophic traces of the cancer on the complex tracks and between complicated groups of cells could be fantasized by a Neutrosophic SuperHyperPath(-/SuperHyperDominating, SuperHyperStar, SuperHyperBipartite, SuperHyperMultipartite, SuperHyperWheel). The aim is to find either the Neutrosophic SuperHyperDominating or the Neutrosophic SuperHyperDominating in those Neutrosophic Neutrosophic SuperHyperModels.

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Table 33.1: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperBipartite

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

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By using the Neutrosophic Figure (33.1) and the Table (33.1), the Neutrosophic SuperHyperBipartite is obtained. 4520  
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The obtained Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite  $ESH B : (V, E)$ , in the Neutrosophic SuperHyperModel (33.1), is the Neutrosophic SuperHyperDominating. 4522  
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**Case 2: The Increasing Neutrosophic Steps Toward Neutrosophic SuperHyperMultipartite as Neutrosophic SuperHyperModel**

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**Step 4. (Neutrosophic Solution)** In the Neutrosophic Figure (34.1), the Neutrosophic SuperHyperMultipartite is Neutrosophic highlighted and Neutrosophic featured.

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By using the Neutrosophic Figure (34.1) and the Table (34.1), the Neutrosophic SuperHyperMultipartite is obtained.

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The obtained Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous

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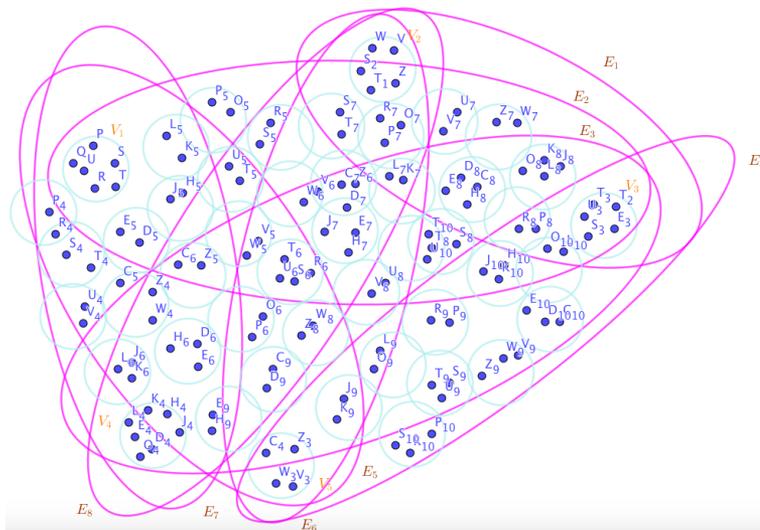


Figure 34.1: a Neutrosophic SuperHyperMultipartite Associated to the Notions of Neutrosophic SuperHyperDominating

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Table 34.1: The Values of Vertices, SuperVertices, Edges, HyperEdges, and SuperHyperEdges Belong to The Neutrosophic SuperHyperMultipartite

The Values of The Vertices	The Number of Position in Alphabet
The Values of The SuperVertices	The maximum Values of Its Vertices
The Values of The Edges	The maximum Values of Its Vertices
The Values of The HyperEdges	The maximum Values of Its Vertices
The Values of The SuperHyperEdges	The maximum Values of Its Endpoints

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result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (34.1), is the Neutrosophic SuperHyperDominating.

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## Wondering Open Problems But As The Directions To Forming The Motivations

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In what follows, some “problems” and some “questions” are proposed. 4542

The SuperHyperDominating and the Neutrosophic SuperHyperDominating are defined on a 4543  
real-world application, titled “Cancer’s Recognitions”. 4544

**Question 35.0.1.** *Which the else SuperHyperModels could be defined based on Cancer’s 4545  
recognitions?* 4546

**Question 35.0.2.** *Are there some SuperHyperNotions related to SuperHyperDominating and the 4547  
Neutrosophic SuperHyperDominating?* 4548

**Question 35.0.3.** *Are there some Algorithms to be defined on the SuperHyperModels to compute 4549  
them?* 4550

**Question 35.0.4.** *Which the SuperHyperNotions are related to beyond the SuperHyperDominating 4551  
and the Neutrosophic SuperHyperDominating?* 4552

**Problem 35.0.5.** *The SuperHyperDominating and the Neutrosophic SuperHyperDominating do a 4553  
SuperHyperModel for the Cancer’s recognitions and they’re based on SuperHyperDominating, are 4554  
there else?* 4555

**Problem 35.0.6.** *Which the fundamental SuperHyperNumbers are related to these SuperHyper- 4556  
Numbers types-results?* 4557

**Problem 35.0.7.** *What’s the independent research based on Cancer’s recognitions concerning the 4558  
multiple types of SuperHyperNotions?* 4559



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## Conclusion and Closing Remarks

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In this section, concluding remarks and closing remarks are represented. The drawbacks of this research are illustrated. Some benefits and some advantages of this research are highlighted. This research uses some approaches to make Neutrosophic SuperHyperGraphs more understandable. In this endeavor, two SuperHyperNotions are defined on the SuperHyperDominating. For that sake in the second definition, the main definition of the Neutrosophic SuperHyperGraph is redefined on the position of the alphabets. Based on the new definition for the Neutrosophic SuperHyperGraph, the new SuperHyperNotion, Neutrosophic SuperHyperDominating, finds the convenient background to implement some results based on that. Some SuperHyperClasses and some Neutrosophic SuperHyperClasses are the cases of this research on the modeling of the regions where are under the attacks of the cancer to recognize this disease as it's mentioned on the title "Cancer's Recognitions". To formalize the instances on the SuperHyperNotion, SuperHyperDominating, the new SuperHyperClasses and SuperHyperClasses, are introduced. Some general results are gathered in the section on the SuperHyperDominating and the Neutrosophic SuperHyperDominating. The clarifications, instances and literature reviews have taken the whole way through. In this research, the literature reviews have fulfilled the lines containing the notions and the results. The SuperHyperGraph and Neutrosophic SuperHyperGraph are the SuperHyperModels on the "Cancer's Recognitions" and both bases are the background of this research. Sometimes the cancer has been happened on the region, full of cells, groups of cells and embedded styles. In this segment, the SuperHyperModel proposes some SuperHyperNotions based on the connectivities of the moves of the cancer in the longest and strongest styles with the formation of the design and the architecture are formally called " SuperHyperDominating" in the themes of jargons and buzzwords. The prefix "SuperHyper" refers to the theme of the embedded styles to figure out the background for the SuperHyperNotions. In the Table (36.1), benefits and avenues for this research are, figured out, pointed out and spoken out.

Table 36.1: An Overlook On This Research And Beyond

136TBLTBL

Advantages	Limitations
1. Redefining Neutrosophic SuperHyperGraph	1. General Results
2. SuperHyperDominating	
3. Neutrosophic SuperHyperDominating	2. Other SuperHyperNumbers
4. Modeling of Cancer's Recognitions	
5. SuperHyperClasses	3. SuperHyperFamilies

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# Neutrosophic SuperHyperDuality But As The Extensions Excerpt From Dense And Super Forms

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**Definition 37.0.1.** (Different Neutrosophic Types of Neutrosophic SuperHyperDuality). 4590  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 4591  
 Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  4592  
 or  $E'$  is called 4593

- (i) **Neutrosophic e-SuperHyperDuality** if  $\forall E_i \in E', \exists E_j \in E_{ESHG:(V,E)} \setminus E'$  such that 4594  
 $V_a \in E_i, E_j$ ; 4595
- (ii) **Neutrosophic re-SuperHyperDuality** if  $\forall E_i \in E', \exists E_j \in E_{ESHG:(V,E)} \setminus E'$  such that 4596  
 $V_a \in E_i, E_j$  and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 4597
- (iii) **Neutrosophic v-SuperHyperDuality** if  $\forall V_i \in V', \exists V_j \in V_{ESHG:(V,E)} \setminus V'$  such that 4598  
 $V_i, V_j \in E_a$ ; 4599
- (iv) **Neutrosophic rv-SuperHyperDuality** if  $\forall V_i \in V', \exists V_j \in V_{ESHG:(V,E)} \setminus V'$  such that 4600  
 $V_i, V_j \in E_a$  and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 4601
- (v) **Neutrosophic SuperHyperDuality** if it's either of Neutrosophic e-SuperHyperDuality, 4602  
 Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic 4603  
 rv-SuperHyperDuality. 4604

**Definition 37.0.2.** ((Neutrosophic) SuperHyperDuality). 4605  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 4606  
 Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 4607

- (i) an **Extreme SuperHyperDuality** if it's either of Neutrosophic e-SuperHyperDuality, 4608  
 Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic 4609  
 rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  4610  
 is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme 4611  
 cardinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of 4612  
 Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the 4613  
 Extreme SuperHyperDuality; 4614

- (ii) a **Neutrosophic SuperHyperDuality** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDuality;
- (iii) an **Extreme SuperHyperDuality SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality; and the Extreme power is corresponded to its Extreme coefficient;
- (iv) a **Neutrosophic SuperHyperDuality SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDuality; and the Neutrosophic power is corresponded to its Neutrosophic coefficient;
- (v) an **Extreme R-SuperHyperDuality** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality;
- (vi) a **Neutrosophic R-SuperHyperDuality** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDuality;
- (vii) an **Extreme R-SuperHyperDuality SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the

Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperDuality; and the Extreme power is corresponded to its Extreme coefficient;

- (viii) a **Neutrosophic SuperHyperDuality SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperDuality, Neutrosophic re-SuperHyperDuality, Neutrosophic v-SuperHyperDuality, and Neutrosophic rv-SuperHyperDuality and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperDuality; and the Neutrosophic power is corresponded to its Neutrosophic coefficient.

**Example 37.0.3.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned Neutrosophic Figures in every Neutrosophic items.

- On the Figure (29.1), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some empty Extreme SuperHyperEdges but  $E_2$  is a loop Neutrosophic SuperHyperEdge and  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperDuality.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.2), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperDuality.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.3), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4690 4691

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4692 4693

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4694 4695

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4696 4697

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_{3i+1_{i=0}^3}, E_{3i+24_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 6z^8. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_{3i+1_{i=0}^7}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 6z^8.\end{aligned}$$

- On the Figure (29.7), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4698 4699

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_{15}, E_{16}, E_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.8), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4700 4701

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} = \{E_4\}.$$

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.9), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_{3i+1}_{i=0}^3, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_{3i+1}_{i=0}^3, V_{15}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 3z^5.\end{aligned}$$

- On the Figure (29.10), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.11), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_6, V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ 3 \times 3z^2.\end{aligned}$$

- On the Figure (29.12), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_{i=4}^{i \neq 5,7,8}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 5z^5.\end{aligned}$$

- On the Figure (29.13), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4710 4711

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_5, E_9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ &3 \times 3z^2. \end{aligned}$$

- On the Figure (29.14), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4712 4713

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.15), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4714 4715

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.16), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4716 4719

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ &(2 \times 1 \times 2) + (2 \times 4 \times 5)z. \end{aligned}$$

- On the Figure (29.17), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4718 4719

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ &(1 \times 1 \times 2)z. \end{aligned}$$

- On the Figure (29.18), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ &(2 \times 2 \times 2)z. \end{aligned}$$

- On the Figure (29.19), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 3z^4. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_{2i+1_{i=0^5}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 2z^6. \end{aligned}$$

- On the Figure (29.20), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.21), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= 10z. \end{aligned}$$

- On the Figure (29.22), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperDuality, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality}} &= \{E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperDuality SuperHyperPolynomial}} &= 4z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality}} &= \{V_3, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperDuality SuperHyperPolynomial}} &= \\ &= 10 \times 9 + 10 \times 6 + 12 \times 9 + 12 \times 6z^2. \end{aligned}$$

The previous Neutrosophic approach apply on the upcoming Neutrosophic results on Neutrosophic SuperHyperClasses.

**Proposition 37.0.4.** Assume a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . Then 4732

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDuality} = \\
 & = \{E_i\}_{i=1}^{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}} \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDuality\ SuperHyperPolynomial} \\
 & = 3z^{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}} \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperDuality} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}} \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperDuality\ SuperHyperPolynomial} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} z^{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}}
 \end{aligned}$$

*Proof.* Let

4733

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}}, V_{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}}^{EXTERNAL}
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . There's 4734  
 a new way to redefine as 4735

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 4736  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. ■ 4737

136EXM18a

**Example 37.0.5.** In the Figure (30.1), the connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ , is highlighted and featured. The Neutrosophic SuperHyperSet, in the Neutrosophic 4738  
 SuperHyperModel (30.1), is the SuperHyperDuality. 4739  
 SuperHyperModel (30.1), is the SuperHyperDuality. 4740

**Proposition 37.0.6.** Assume a connected Neutrosophic SuperHyperCycle  $ESH C : (V, E)$ . Then 4741

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDuality} = \\
 & = \{E_i\}_{i=1}^{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}} \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperDuality\ SuperHyperPolynomial} \\
 & = 3z^{\frac{|ESHG:(V,E)|_{Neutrosophic\ Cardinality}}{3}} \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperDuality}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}} \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperDuality\ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} z^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. ■

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136EXM19a

**Example 37.0.7.** In the Figure (30.2), the connected Neutrosophic SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.2), is the Neutrosophic SuperHyperDuality.

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**Proposition 37.0.8.** Assume a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperDuality} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperDuality\ SuperHyperPolynomial} \\
 &= |i \mid E_i \in E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} |z|. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-Quasi-SuperHyperDuality} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-Quasi-SuperHyperDuality\ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

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$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

be a longest path taken a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. ■

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**Example 37.0.9.** In the Figure (30.3), the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , in the Neutrosophic SuperHyperModel (30.3), is the Neutrosophic SuperHyperDuality.

**Proposition 37.0.10.** Assume a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperDuality}} \\
 &= \{E_i \in E_{P_i^{ESHG:(V,E)}}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperDuality SuperHyperPolynomial}} \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 & \quad z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperDuality}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, V_j^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperDuality SuperHyperPolynomial}} \\
 &= \sum_{|V_{P_i^{ESHG:(V,E)}}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. Then there's at least one SuperHyperDuality. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperDuality could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$P :$$

$$\begin{aligned}
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest SuperHyperDuality taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

The latter is straightforward. ■ 4774

136EXM21a

**Example 37.0.11.** In the Neutrosophic Figure (30.4), the connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ , is Neutrosophic highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ , in the Neutrosophic SuperHyperModel (30.4), is the Neutrosophic SuperHyperDuality.

**Proposition 37.0.12.** Assume a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Then

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperDuality} \\
 &= \{E_i \in E_{P_i^{ESHG:(V,E)}}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperDuality\ SuperHyperPolynomial} \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose} |P_i^{ESHG:(V,E)}| \right) \\
 &\quad z^{\min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperDuality} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{EXTERNAL} \in P^{ESHG:(V,E)}}, V_i^{EXTERNAL} \in V_{P_i^{EXTERNAL} \in P^{ESHG:(V,E)}}, i \neq j\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperDuality\ SuperHyperPolynomial} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{Neutrosophic\ Cardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest SuperHyperDuality taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. Then there's at least one SuperHyperDuality. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperDuality could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

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$$\begin{aligned}
 P : \\
 V_1^{EXTERNAL}, E_1, \\
 V_2^{EXTERNAL}, E_2, \\
 \dots, \\
 E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{EXTERNAL} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

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136EXM22a

**Example 37.0.13.** In the Figure (30.5), the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (30.5), is the Neutrosophic SuperHyperDuality.

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**Proposition 37.0.14.** Assume a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . 4801  
 Then, 4802

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperDuality}} &= \{E^* \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperDuality SuperHyperPolynomial}} \\ &= |i \mid E_i^* \in E_{ESHG:(V,E)}^*|_{\text{Neutrosophic Cardinality}} |z|. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperDuality}} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperDuality SuperHyperPolynomial}} &= z. \end{aligned}$$

*Proof.* Let 4803

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1^*, \\ V_2^{EXTERNAL}, E_2^*, \\ \dots, \\ E_{|E_{ESHG:(V,E)}^*|_{\text{Neutrosophic Cardinality}}}^*, V_{|E_{ESHG:(V,E)}^*|_{\text{Neutrosophic Cardinality}}+1}^{EXTERNAL} \end{aligned}$$

is a longest SuperHyperDuality taken from a connected Neutrosophic SuperHyperWheel 4804  
 $ESHW : (V, E)$ . There's a new way to redefine as 4805

$$\begin{aligned} V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\ \exists! E_z^* \in E_{ESHG:(V,E)}^*, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z^* &\equiv \\ \exists! E_z^* \in E_{ESHG:(V,E)}^*, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z^*. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 4806  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperDuality. The latter is straightforward. Then there's 4807  
 at least one SuperHyperDuality. Thus the notion of quasi isn't up and the SuperHyperNotions 4808  
 based on SuperHyperDuality could be applied. The unique embedded SuperHyperDuality 4809  
 proposes some longest SuperHyperDuality excerpt from some representatives. The latter is 4810  
 straightforward. ■ 4811

136EXM23a

**Example 37.0.15.** In the Neutrosophic Figure (30.6), the connected Neutrosophic SuperHyper- 4812  
 Wheel  $NSHW : (V, E)$ , is Neutrosophic highlighted and featured. The obtained Neutrosophic 4813  
 SuperHyperSet, by the Algorithm in previous result, of the Neutrosophic SuperHyperVertices of 4814  
 the connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ , in the Neutrosophic SuperHy- 4815  
 perModel (30.6), is the Neutrosophic SuperHyperDuality. 4816



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## Neutrosophic SuperHyperJoin But As The Extensions Excerpt From Dense And Super Forms

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**Definition 38.0.1.** (Different Neutrosophic Types of Neutrosophic SuperHyperJoin). 4821  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 4822  
 Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  4823  
 or  $E'$  is called 4824

(i) **Neutrosophic e-SuperHyperJoin** if  $\forall E_i \in E_{NSHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that 4825  
 $V_a \in E_i, E_j$ ; and  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; 4826

(ii) **Neutrosophic re-SuperHyperJoin** if  $\forall E_i \in E_{NSHG:(V,E)} \setminus E', \exists E_j \in E'$ , such that 4827  
 $V_a \in E_i, E_j$ ;  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  4828  
 $|E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 4829

(iii) **Neutrosophic v-SuperHyperJoin** if  $\forall V_i \in E_{NSHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 4830  
 $V_i, V_j \notin E_a$ ; and  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; 4831

(iv) **Neutrosophic rv-SuperHyperJoin** if  $\forall V_i \in E_{NSHG:(V,E)} \setminus V', \exists V_j \in V'$ , such that 4832  
 $V_i, V_j \in E_a$ ;  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  4833  
 $|V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 4834

(v) **Neutrosophic SuperHyperJoin** if it's either of Neutrosophic e-SuperHyperJoin, 4835  
 Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, and Neutrosophic rv- 4836  
 SuperHyperJoin. 4837

**Definition 38.0.2.** ((Neutrosophic) SuperHyperJoin). 4838  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 4839  
 Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 4840

(i) an **Extreme SuperHyperJoin** if it's either of Neutrosophic e-SuperHyperJoin, Neutrosophic 4841  
 re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, and Neutrosophic rv- 4842  
 SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is 4843  
 the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme car- 4844  
 dinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of Extreme 4845

- SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperJoin; 4846  
4847
- (ii) a **Neutrosophic SuperHyperJoin** if it's either of Neutrosophic e-SuperHyperJoin, 4848  
Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, and Neutrosophic 4849  
rv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  : 4850  
is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges 4851  
of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive 4852  
Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they 4853  
form the Neutrosophic SuperHyperJoin; 4854
- (iii) an **Extreme SuperHyperJoin SuperHyperPolynomial** if it's either of Neutrosophic 4855  
e-SuperHyperJoin, Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, 4856  
and Neutrosophic rv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph 4857  
 $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients 4858  
defined as the Extreme number of the maximum Extreme cardinality of the Extreme 4859  
SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive 4860  
Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the 4861  
Extreme SuperHyperJoin; and the Extreme power is corresponded to its Extreme coefficient; 4862
- (iv) a **Neutrosophic SuperHyperJoin SuperHyperPolynomial** if it's either of 4863  
Neutrosophic e-SuperHyperJoin, Neutrosophic re-SuperHyperJoin, Neutrosophic v- 4864  
SuperHyperJoin, and Neutrosophic rv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for a Neutrosophic 4865  
SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the 4866  
Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic 4867  
cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of 4868  
high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutro- 4869  
sophic SuperHyperVertices such that they form the Neutrosophic SuperHyperJoin; and the 4870  
Neutrosophic power is corresponded to its Neutrosophic coefficient; 4871
- (v) an **Extreme R-SuperHyperJoin** if it's either of Neutrosophic e-SuperHyperJoin, 4872  
Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, and Neutrosophic rv- 4873  
SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the 4874  
maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality 4875  
of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme 4876  
SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme 4877  
SuperHyperJoin; 4878
- (vi) a **Neutrosophic R-SuperHyperJoin** if it's either of Neutrosophic e-SuperHyperJoin, 4879  
Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, and Neutrosophic rv- 4880  
SuperHyperJoin and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  4881  
is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices 4882  
of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive 4883  
Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they 4884  
form the Neutrosophic SuperHyperJoin; 4885
- (vii) an **Extreme R-SuperHyperJoin SuperHyperPolynomial** if it's either of Neutrosophic 4886  
e-SuperHyperJoin, Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, 4887

and Neutrosophic rv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperJoin; and the Extreme power is corresponded to its Extreme coefficient;

(viii) a **Neutrosophic SuperHyperJoin SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperJoin, Neutrosophic re-SuperHyperJoin, Neutrosophic v-SuperHyperJoin, and Neutrosophic rv-SuperHyperJoin and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperJoin; and the Neutrosophic power is corresponded to its Neutrosophic coefficient.

**Example 38.0.3.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned Neutrosophic Figures in every Neutrosophic items.

- On the Figure (29.1), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_2$  is a loop Neutrosophic SuperHyperEdge and  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperJoin.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.2), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperJoin.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 3z. \end{aligned}$$

136EXM1

- On the Figure (29.3), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4921 4922

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4923 4924

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4925 4926

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4927 4928

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_{3i+1_{i=0}^3}, E_{3i+24_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 6z^8. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_{3i+1_{i=0}^7}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 6z^8.\end{aligned}$$

- On the Figure (29.7), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4929 4930

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_{15}, E_{16}, E_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 4 \times 5 \times 5z^3.\end{aligned}$$

- On the Figure (29.8), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4931 4932

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} = \{E_4\}.$$

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3. \end{aligned}$$

- On the Figure (29.9), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4933 4934

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_{3i+1}_{i=0}^3, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_{3i+1}_{i=0}^3, V_{15}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 3z^5. \end{aligned}$$

- On the Figure (29.10), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4935 4936

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_3, V_{13}, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ 4 \times 5 \times 5z^3. \end{aligned}$$

- On the Figure (29.11), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4937 4938

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_6, V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ 3 \times 3z^2. \end{aligned}$$

- On the Figure (29.12), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4939 4940

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1, V_{i=4}^{i \neq 5,7,8}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 5z^5. \end{aligned}$$

- On the Figure (29.13), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4941  
4942

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_3, E_9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ &3 \times 3z^2.\end{aligned}$$

- On the Figure (29.14), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4943  
4944

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.15), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4945  
4946

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.16), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4947  
4948

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ &(1 \times 5 \times 5) + (1 \times 2 + 1)z^3.\end{aligned}$$

- On the Figure (29.17), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4949  
4950

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ &(1 \times 1 \times 2 + 1)z^4.\end{aligned}$$

- On the Figure (29.18), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4951  
4952

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ &= (1 \times 1 \times 2 + 1)z^4. \end{aligned}$$

- On the Figure (29.19), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4953  
4954

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^4. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_{2i+1_{i=0^5}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 2z^6. \end{aligned}$$

- On the Figure (29.20), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4955  
4956

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.21), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4957  
4958

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= 10z. \end{aligned}$$

- On the Figure (29.22), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperJoin, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 4959  
4960

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} &= \{E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} &= \{V_3, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} &= \\ &= 10 \times 6 + 10 \times 6 + 12 \times 6 + 12 \times 6z^2. \end{aligned}$$

The previous Neutrosophic approach apply on the upcoming Neutrosophic results on Neutrosophic SuperHyperClasses. 4961  
4962

**Proposition 38.0.4.** Assume a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . Then 4963

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}} \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} \\
 & = 3\mathcal{Z}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}} \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}} \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin SuperHyperPolynomial}} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} \mathcal{Z}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}
 \end{aligned}$$

*Proof.* Let

4964

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}^{EXTERNAL}
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . There's 4965  
 a new way to redefine as 4966

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 4967  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. ■ 4968

136EXM18a

**Example 38.0.5.** In the Figure (30.1), the connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ , is highlighted and featured. The Neutrosophic SuperHyperSet, in the Neutrosophic 4969  
 SuperHyperModel (30.1), is the SuperHyperJoin. 4970  
 4971

**Proposition 38.0.6.** Assume a connected Neutrosophic SuperHyperCycle  $ESH C : (V, E)$ . Then 4972

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin}} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}} \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} \\
 & = 3\mathcal{Z}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}} \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperJoin}}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}} \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperJoin\ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} z^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

4973

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. ■

136EXM19a

**Example 38.0.7.** In the Figure (30.2), the connected Neutrosophic SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.2), is the Neutrosophic SuperHyperJoin.

**Proposition 38.0.8.** Assume a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . Then

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperJoin} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperJoin\ SuperHyperPolynomial} \\
 &= |i | E_i \in E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} |z|. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-Quasi-SuperHyperJoin} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-Quasi-SuperHyperJoin\ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

4982

$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

be a longest path taken a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. ■

136EXM20a

**Example 38.0.9.** In the Figure (30.3), the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , in the Neutrosophic SuperHyperModel (30.3), is the Neutrosophic SuperHyperJoin.

**Proposition 38.0.10.** Assume a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin}} \\
 &= (\text{PERFECT MATCHING}). \\
 & \{E_i \in E_{P_i^{ESHG:(V,E)}}, \\
 & \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin}} \\
 &= (\text{OTHERWISE}). \\
 & \{\}, \\
 & \text{If } \exists P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \neq \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} \\
 &= (\text{PERFECT MATCHING}). \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 & z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} \\
 &= (\text{OTHERWISE})0. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . 4995  
There's a new way to redefine as 4996

$$\begin{aligned} V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 4997  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. Then there's 4998  
no at least one SuperHyperJoin. Thus the notion of quasi may be up but the SuperHyperNotions 4999  
based on SuperHyperJoin could be applied. There are only two SuperHyperParts. Thus every 5000  
SuperHyperPart could have one SuperHyperVertex as the representative in the 5001

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}} \end{aligned}$$

is a longest SuperHyperJoin taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . 5002  
Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart 5003  
SuperHyperEdges are attained in any solution 5004

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}} \end{aligned}$$

The latter is straightforward. ■ 5005

136EXM21a

**Example 38.0.11.** In the Neutrosophic Figure (30.4), the connected Neutrosophic SuperHyper- 5006  
Bipartite  $ESHB : (V, E)$ , is Neutrosophic highlighted and Neutrosophic featured. The obtained 5007  
Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result, 5008  
of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite 5009  
 $ESHB : (V, E)$ , in the Neutrosophic SuperHyperModel (30.4), is the Neutrosophic SuperHyper- 5010  
Join. 5011

**Proposition 38.0.12.** Assume a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . 5012

Then

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$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin}} \\
 &= (\text{PERFECT MATCHING}). \\
 & \{E_i \in E_{P_i^{ESHG:(V,E)}}, \\
 & \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin}} \\
 &= (\text{OTHERWISE}). \\
 & \{\}, \\
 & \text{If } \exists P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \neq \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} \\
 &= (\text{PERFECT MATCHING}). \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 & \quad z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperJoin SuperHyperPolynomial}} \\
 &= (\text{OTHERWISE})0. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_j^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperJoin SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest SuperHyperJoin taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. Then there's no at least one SuperHyperJoin. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperJoin could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

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$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|}, V_{\min_i |P_i^{EXTERNAL} \in PESHG:(V,E)|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

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$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|}, V_{\min_i |P_i^{EXTERNAL} \in PESHG:(V,E)|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

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136EXM22a

**Example 38.0.13.** In the Figure (30.5), the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (30.5), is the Neutrosophic SuperHyperJoin.

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**Proposition 38.0.14.** Assume a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . Then,

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperJoin} = \\
 &= \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperJoin\ SuperHyperPolynomial} \\
 &= 3z^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperJoin} \\
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperJoin\ SuperHyperPolynomial} \\
 &= \prod |V_{ESHG:(V,E)}^{EXTERNAL}|_{Neutrosophic\ Cardinality} z^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

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$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &\underline{E_{ESHG:(V,E)}^{Neutrosophic Cardinality}}_3, V^{EXTERNAL} \underline{E_{ESHG:(V,E)}^{Neutrosophic Cardinality}}_3.
 \end{aligned}$$

is a longest SuperHyperJoin taken from a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperJoin. The latter is straightforward. Then there's at least one SuperHyperJoin. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperJoin could be applied. The unique embedded SuperHyperJoin proposes some longest SuperHyperJoin excerpt from some representatives. The latter is straightforward. ■

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136EXM23a

**Example 38.0.15.** In the Neutrosophic Figure (30.6), the connected Neutrosophic SuperHyperWheel  $NSHW : (V, E)$ , is Neutrosophic highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ , in the Neutrosophic SuperHyperModel (30.6), is the Neutrosophic SuperHyperJoin.

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## Neutrosophic SuperHyperPerfect But As The Extensions Excerpt From Dense And Super Forms

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**Definition 39.0.1.** (Different Neutrosophic Types of Neutrosophic SuperHyperPerfect). 5051  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 5052  
 Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  5053  
 or  $E'$  is called 5054

- (i) **Neutrosophic e-SuperHyperPerfect** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists! E_j \in E'$ , such that 5055  
 $V_a \in E_i, E_j$ ; 5056
- (ii) **Neutrosophic re-SuperHyperPerfect** if  $\forall E_i \in E_{ESHG:(V,E)} \setminus E', \exists! E_j \in E'$ , such that 5057  
 $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 5058
- (iii) **Neutrosophic v-SuperHyperPerfect** if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists! V_j \in V'$ , such that 5059  
 $V_i, V_j \in E_a$ ; 5060
- (iv) **Neutrosophic rv-SuperHyperPerfect** if  $\forall V_i \in V_{ESHG:(V,E)} \setminus V', \exists! V_j \in V'$ , such that 5061  
 $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 5062
- (v) **Neutrosophic SuperHyperPerfect** if it's either of Neutrosophic e-SuperHyperPerfect, 5063  
 Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic 5064  
 rv-SuperHyperPerfect. 5065

**Definition 39.0.2.** ((Neutrosophic) SuperHyperPerfect). 5066  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 5067  
 Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 5068

- (i) an **Extreme SuperHyperPerfect** if it's either of Neutrosophic e-SuperHyperPerfect, 5069  
 Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic 5070  
 rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  5071  
 is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme 5072  
 cardinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of 5073  
 Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the 5074  
 Extreme SuperHyperPerfect; 5075

- (ii) a **Neutrosophic SuperHyperPerfect** if it's either of Neutrosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperPerfect;
- (iii) an **Extreme SuperHyperPerfect SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperPerfect; and the Extreme power is corresponded to its Extreme coefficient;
- (iv) a **Neutrosophic SuperHyperPerfect SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperPerfect; and the Neutrosophic power is corresponded to its Neutrosophic coefficient;
- (v) an **Extreme R-SuperHyperPerfect** if it's either of Neutrosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperPerfect;
- (vi) a **Neutrosophic R-SuperHyperPerfect** if it's either of Neutrosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperPerfect;
- (vii) an **Extreme R-SuperHyperPerfect SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v-SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the

Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality 5119  
 of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme 5120  
 cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such 5121  
 that they form the Extreme SuperHyperPerfect; and the Extreme power is corresponded to 5122  
 its Extreme coefficient; 5123

(viii) a **Neutrosophic SuperHyperPerfect SuperHyperPolynomial** if it's either of Neut- 5124  
 rosophic e-SuperHyperPerfect, Neutrosophic re-SuperHyperPerfect, Neutrosophic v- 5125  
 SuperHyperPerfect, and Neutrosophic rv-SuperHyperPerfect and  $\mathcal{C}(NSHG)$  for a Neut- 5126  
 rosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial 5127  
 contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum 5128  
 Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic Super- 5129  
 HyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges 5130  
 and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyper- 5131  
 Perfect; and the Neutrosophic power is corresponded to its Neutrosophic coefficient. 5132

**Example 39.0.3.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair 5133  
 $S = (V, E)$  in the mentioned Neutrosophic Figures in every Neutrosophic items. 5134

- On the Figure (29.1), the Neutrosophic SuperHyperNotion, namely, Neutrosophic 5135  
 SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5136  
 $E_1$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_2$  is a loop Neutrosophic 5137  
 SuperHyperEdge and  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of 5138  
 Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely, 5139  
 $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no 5140  
 Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic 5141  
 SuperHyperVertex,  $V_3$ , is excluded in every given Neutrosophic SuperHyperPerfect. 5142

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.2), the Neutrosophic SuperHyperNotion, namely, Neutrosophic 5143  
 SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5144  
 $E_1, E_2$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_4$  is a Neutrosophic 5145  
 SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only 5146  
 one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  5147  
 is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a 5148  
 Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , is excluded in every 5149  
 given Neutrosophic SuperHyperPerfect. 5150

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 3z. \end{aligned}$$

136EXM1

- On the Figure (29.3), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5151 5152

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5153 5154

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5155 5156

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5157 5158

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_{3i+1_{i=0}^3}, E_{3i+24_{i=0}^3}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 6z^8. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_{3i+1_{i=0}^7}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 6z^8.\end{aligned}$$

- On the Figure (29.7), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5159 5160

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_{15}, E_{16}, E_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &= 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.8), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5161 5162

$$\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} = \{E_4\}.$$

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.9), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} &= \{E_{3i+1^3_{i=0}}, E_{23}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 3z^5. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect}} &= \{V_{3i+1^3_{i=0}}, V_{15}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 3z^5.\end{aligned}$$

- On the Figure (29.10), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_3, V_6, V_8\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.11), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_1, E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_6, V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= \\ 3 \times 2z^2.\end{aligned}$$

- On the Figure (29.12), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1, V_{i=4}^{i \neq 5,7,8}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 5z^5.\end{aligned}$$

- On the Figure (29.13), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5171 5172

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_3, E_9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &3 \times 3z^2.\end{aligned}$$

- On the Figure (29.14), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5173 5174

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.15), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5175 5176

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.16), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5177 5178

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect}} &= \{V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &(1 \times 5 \times 5) + (1 \times 2 + 1)z^3.\end{aligned}$$

- On the Figure (29.17), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5179 5180

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= \\ &(1 \times 1 \times 2 + 1)z^4.\end{aligned}$$

- On the Figure (29.18), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 3z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect}} &= \{V_{27}, V_2, V_7, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= (1 \times 1 \times 2 + 1)z^4. \end{aligned}$$

- On the Figure (29.19), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_{3i+1_{i=0^3}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 3z^4. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect}} &= \{V_{2i+1_{i=0^5}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 2z^6. \end{aligned}$$

- On the Figure (29.20), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.21), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= 2z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} &= 10z. \end{aligned}$$

- On the Figure (29.22), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperPerfect, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} &= \{E_2, E_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect}} &= \{V_3, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperPerfect SuperHyperPolynomial}} &= 10 \times 6 + 10 \times 6 + 12 \times 6 + 12 \times 6z^2. \end{aligned}$$

The previous Neutrosophic approach apply on the upcoming Neutrosophic results on Neutrosophic SuperHyperClasses.

**Proposition 39.0.4.** Assume a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . Then 5193

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect SuperHyperPolynomial}} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} z^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}.
 \end{aligned}$$

*Proof.* Let

5194

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . There's 5195  
 a new way to redefine as 5196

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 5197  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. ■ 5198

136EXM18a

**Example 39.0.5.** In the Figure (30.1), the connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ , is highlighted and featured. The Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.1), is the SuperHyperPerfect. 5199  
 5200  
 5201

**Proposition 39.0.6.** Assume a connected Neutrosophic SuperHyperCycle  $ESH C : (V, E)$ . Then 5202

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect}} = \\
 & = \{E_i\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} \\
 & = 3z^{\frac{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}}{3}}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperPerfect}}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}} \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperPerfect\ SuperHyperPolynomial} \\
 &= \prod |V^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} z^{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}.
 \end{aligned}$$

*Proof.* Let

5203

$$\begin{aligned}
 &P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}, V_{\frac{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}}{3}}^{EXTERNAL}.
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. ■

136EXM19a

**Example 39.0.7.** In the Figure (30.2), the connected Neutrosophic SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.2), is the Neutrosophic SuperHyperPerfect.

**Proposition 39.0.8.** Assume a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . Then

$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperPerfect} = \{E \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperPerfect\ SuperHyperPolynomial} \\
 &= |i \mid E_i \in E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} |z|. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperPerfect} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperPerfect\ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

5212

$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

be a longest path taken a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. ■

**Example 39.0.9.** In the Figure (30.3), the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , in the Neutrosophic SuperHyperModel (30.3), is the Neutrosophic SuperHyperPerfect.

**Proposition 39.0.10.** Assume a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} \\
 &= (\text{PERFECT MATCHING}). \\
 & \{E_i \in E_{P_i^{ESHG:(V,E)}}, \\
 & \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} \\
 &= (\text{OTHERWISE}). \\
 & \{\}, \\
 & \text{If } \exists P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \neq \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} \\
 &= (\text{PERFECT MATCHING}). \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 & z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} \\
 &= (\text{OTHERWISE})0. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . 5225  
 There's a new way to redefine as 5226

$$\begin{aligned} V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 5227  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. Then there's 5228  
 no at least one SuperHyperPerfect. Thus the notion of quasi may be up but the SuperHyperNotions 5229  
 based on SuperHyperPerfect could be applied. There are only two SuperHyperParts. Thus every 5230  
 SuperHyperPart could have one SuperHyperVertex as the representative in the 5231

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL} \end{aligned}$$

is a longest SuperHyperPerfect taken from a connected Neutrosophic SuperHyperBipartite 5232  
 $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of- 5233  
 SuperHyperPart SuperHyperEdges are attained in any solution 5234

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2, \\ \dots, \\ E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL} \end{aligned}$$

The latter is straightforward. ■ 5235

136EXM21a

**Example 39.0.11.** In the Neutrosophic Figure (30.4), the connected Neutrosophic SuperHyper- 5236  
 Bipartite  $ESHB : (V, E)$ , is Neutrosophic highlighted and Neutrosophic featured. The obtained 5237  
 Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result, 5238  
 of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite 5239  
 $ESHB : (V, E)$ , in the Neutrosophic SuperHyperModel (30.4), is the Neutrosophic SuperHyper- 5240  
 Perfect. 5241

**Proposition 39.0.12.** Assume a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . 5242

Then

5243

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} \\
 &= (\text{PERFECT MATCHING}). \\
 & \{E_i \in E_{P_i^{ESHG:(V,E)}}, \\
 & \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} \\
 &= (\text{OTHERWISE}). \\
 & \{\}, \\
 & \text{If } \exists P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \neq \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} \\
 &= (\text{PERFECT MATCHING}). \\
 &= \left( \sum_{i=|P^{ESHG:(V,E)}|} (\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|) \text{choose } |P_i^{ESHG:(V,E)}| \right) \\
 & \quad z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperPerfect SuperHyperPolynomial}} \\
 &= (\text{OTHERWISE})0. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect}} \\
 &= \{V_i^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_j^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperPerfect SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

Proof. Let

5244

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2, \\
 & \dots, \\
 & E_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|}, V_{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest SuperHyperPerfect taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

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5246

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. Then there's no at least one SuperHyperPerfect. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperPerfect could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$\begin{aligned}
 P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|}, V_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$\begin{aligned}
 P : \\
 &V_1^{EXTERNAL}, E_1, \\
 &V_2^{EXTERNAL}, E_2, \\
 &\dots, \\
 &E_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|}, V_{\min_i |P_i^{ESHG:(V,E)} \in PESHG:(V,E)|+1}^{EXTERNAL}
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

136EXM22a

**Example 39.0.13.** In the Figure (30.5), the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (30.5), is the Neutrosophic SuperHyperPerfect.

**Proposition 39.0.14.** Assume a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . Then,

$$\begin{aligned}
 \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperPerfect} &= \{E \in E_{ESHG:(V,E)}\}. \\
 \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperPerfect\ SuperHyperPolynomial} \\
 &= |i \mid E_i \in E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} |z|. \\
 \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperPerfect} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\
 \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperPerfect\ SuperHyperPolynomial} &= z.
 \end{aligned}$$

*Proof.* Let 5264

$$P : V_i^{EXTERNAL}, E_i, CENTER, V_j^{EXTERNAL}.$$

is a longest SuperHyperPerfect taken from a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\
 \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperPerfect. The latter is straightforward. Then there's at least one SuperHyperPerfect. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperPerfect could be applied. The unique embedded SuperHyperPerfect proposes some longest SuperHyperPerfect excerpt from some representatives. The latter is straightforward. ■

136EXM23a

**Example 39.0.15.** In the Neutrosophic Figure (30.6), the connected Neutrosophic SuperHyperWheel  $NSHW : (V, E)$ , is Neutrosophic highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ , in the Neutrosophic SuperHyperModel (30.6), is the Neutrosophic SuperHyperPerfect.

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# Neutrosophic SuperHyperTotal But As The Extensions Excerpt From Dense And Super Forms

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**Definition 40.0.1.** (Different Neutrosophic Types of Neutrosophic SuperHyperTotal). 5282  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 5283  
 Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  5284  
 or  $E'$  is called 5285

- (i) **Neutrosophic e-SuperHyperTotal** if  $\forall E_i \in E_{ESHG:(V,E)}, \exists! E_j \in E'$ , such that 5286  
 $V_a \in E_i, E_j$ ; 5287
- (ii) **Neutrosophic re-SuperHyperTotal** if  $\forall E_i \in E_{ESHG:(V,E)}, \exists! E_j \in E'$ , such that 5288  
 $V_a \in E_i, E_j$ ; and  $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 5289
- (iii) **Neutrosophic v-SuperHyperTotal** if  $\forall V_i \in V_{ESHG:(V,E)}, \exists! V_j \in V'$ , such that 5290  
 $V_i, V_j \in E_a$ ; 5291
- (iv) **Neutrosophic rv-SuperHyperTotal** if  $\forall V_i \in V_{ESHG:(V,E)}, \exists! V_j \in V'$ , such that 5292  
 $V_i, V_j \in E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} = |V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 5293
- (v) **Neutrosophic SuperHyperTotal** if it's either of Neutrosophic e-SuperHyperTotal, 5294  
 Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic 5295  
 rv-SuperHyperTotal. 5296

**Definition 40.0.2.** ((Neutrosophic) SuperHyperTotal). 5297  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 5298  
 Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 5299

- (i) an **Extreme SuperHyperTotal** if it's either of Neutrosophic e-SuperHyperTotal, 5300  
 Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic 5301  
 rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  5302  
 is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme 5303  
 cardinality of the Extreme SuperHyperEdges in the consecutive Extreme sequence of 5304  
 Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the 5305  
 Extreme SuperHyperTotal; 5306

- (ii) a **Neutrosophic SuperHyperTotal** if it's either of Neutrosophic e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperTotal;
- (iii) an **Extreme SuperHyperTotal SuperHyperPolynomial** if it's either of e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal; and the Extreme power is corresponded to its Extreme coefficient;
- (iv) a **Neutrosophic SuperHyperTotal SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperTotal; and the Neutrosophic power is corresponded to its Neutrosophic coefficient;
- (v) an **Extreme R-SuperHyperTotal** if it's either of Neutrosophic e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal;
- (vi) a **Neutrosophic R-SuperHyperTotal** if it's either of Neutrosophic e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperTotal;
- (vii) an **Extreme R-SuperHyperTotal SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the

Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperTotal; and the Extreme power is corresponded to its Extreme coefficient;

(viii) a **Neutrosophic SuperHyperTotal SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperTotal, Neutrosophic re-SuperHyperTotal, Neutrosophic v-SuperHyperTotal, and Neutrosophic rv-SuperHyperTotal and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperTotal; and the Neutrosophic power is corresponded to its Neutrosophic coefficient.

**Example 40.0.3.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned Neutrosophic Figures in every Neutrosophic items.

- On the Figure (29.1), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_2$  is a loop Neutrosophic SuperHyperEdge and  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperTotal.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.2), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperTotal.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3z. \end{aligned}$$

136EXM1

- On the Figure (29.3), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5382 5383

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.4), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5384 5385

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-}} &= \{E_4, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 15z^2. \end{aligned}$$

- On the Figure (29.5), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5386 5387

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \end{aligned}$$

- On the Figure (29.6), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5388 5389

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal SuperHyperPolynomial}} &= 20z^{10}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperTotal}} &= \{V_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperTotal SuperHyperPolynomial}} &= 20z^{10}. \end{aligned}$$

- On the Figure (29.7), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5390 5391

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_{12}, E_{13}, E_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= z^3. \end{aligned}$$

- On the Figure (29.8), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5392 5393

$$\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal}} = \{E_4\}.$$

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3. \end{aligned}$$

- On the Figure (29.9), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5394 5395

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal SuperHyperPolynomial}} &= 10z^{10}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperTotal}} &= \{V_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperTotal SuperHyperPolynomial}} &= 20z^{10}. \end{aligned}$$

- On the Figure (29.10), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5396 5397

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperTotal SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3. \end{aligned}$$

- On the Figure (29.11), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5398 5399

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_1, E_6, E_7, E_8\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 2z^4. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= 3z^2. \end{aligned}$$

- On the Figure (29.12), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5400 5401

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 5z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_{i=1}^{i \neq 4,5,6}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= z^5. \end{aligned}$$

- On the Figure (29.13), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5402 5403

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_3, E_9, E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 3z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= 3z^2. \end{aligned}$$

- On the Figure (29.14), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5404 5405

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_3\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= 2z^2.\end{aligned}$$

- On the Figure (29.15), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5406 5407

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_2, V_3, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= z^3.\end{aligned}$$

- On the Figure (29.16), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5408 5409

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &4 \times 3z^3.\end{aligned}$$

- On the Figure (29.17), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5410 5411

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &4 \times 3z^4.\end{aligned}$$

- On the Figure (29.18), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5412 5413

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= \\ &2 \times 4 \times 3z^4.\end{aligned}$$

- On the Figure (29.19), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5414 5415

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal}} &= \{E_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal SuperHyperPolynomial}} &= 11z^{10}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal}} &= \{V_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 11z^{10}.\end{aligned}$$

- On the Figure (29.20), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5416 5417

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_6, E_{10}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= 9z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal}} &= \{V_1, V\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperTotal SuperHyperPolynomial}} &= (|V| - 1)z^2.\end{aligned}$$

- On the Figure (29.21), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5418 5419

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal SuperHyperPolynomial}} &= 2z^2. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperTotal}} &= \{V_1, V_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperTotal SuperHyperPolynomial}} &= 9z^2.\end{aligned}$$

- On the Figure (29.22), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperTotal, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5420 5421

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal}} &= \{E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperTotal SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperTotal}} &= \{V_3, V_{10}, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperTotal SuperHyperPolynomial}} &= 3 \times 6z^3.\end{aligned}$$

The previous Neutrosophic approach apply on the upcoming Neutrosophic results on Neutrosophic SuperHyperClasses. 5422 5423

**Proposition 40.0.4.** Assume a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . Then 5424

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} = \\
 & = \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}. \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal\ SuperHyperPolynomial} \\
 & = z^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}. \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperTotal} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}. \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperTotal\ SuperHyperPolynomial} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} z^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}
 \end{aligned}$$

*Proof.* Let

5425

$$\begin{aligned}
 & P : \\
 & V_2^{EXTERNAL}, E_2, \\
 & V_3^{EXTERNAL}, E_3, \\
 & \dots, \\
 & E_{|E|_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-1}, V_{|E|_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-1}^{EXTERNAL}
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ . There's 5426  
 a new way to redefine as 5427

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 5428  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. ■ 5429

136EXM18a

**Example 40.0.5.** In the Figure (30.1), the connected Neutrosophic SuperHyperPath  $ESH P : (V, E)$ , is highlighted and featured. The Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.1), is the SuperHyperTotal. 5430  
 5431  
 5432

**Proposition 40.0.6.** Assume a connected Neutrosophic SuperHyperCycle  $ESH C : (V, E)$ . Then 5433

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} = \\
 & = \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}. \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal\ SuperHyperPolynomial} \\
 & = (|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality} - 1) \\
 & z^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}. \\
 & \mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperTotal} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}-2}.
 \end{aligned}$$

$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{Neutrosophic } R\text{-SuperHyperTotal SuperHyperPolynomial}} \\ &= \prod |V^{\text{EXTERNAL}}_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} z^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2} \end{aligned}$$

*Proof.* Let

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$$\begin{aligned} & P : \\ & V_2^{\text{EXTERNAL}}, E_2, \\ & V_3^{\text{EXTERNAL}}, E_3, \\ & \dots, \\ & \frac{E^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1}}{V^{\text{EXTERNAL}}_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1} \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned} & V_i^{\text{EXTERNAL}} \sim V_j^{\text{EXTERNAL}} \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}} \in E_z \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}}\} \subseteq E_z. \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{\text{EXTERNAL}})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{\text{EXTERNAL}}$  in the literatures of SuperHyperTotal. The latter is straightforward. ■

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136EXM19a

**Example 40.0.7.** In the Figure (30.2), the connected Neutrosophic SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.2), is the Neutrosophic SuperHyperTotal.

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**Proposition 40.0.8.** Assume a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal}} = \{E_i, E_j \in E_{ESHG:(V,E)}\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperTotal SuperHyperPolynomial}} \\ &= |i(i-1) \mid E_i \in E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} z^2. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic } R\text{-SuperHyperTotal}} = \{CENTER, V_j \in V_{ESHG:(V,E)}\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic } R\text{-SuperHyperTotal SuperHyperPolynomial}} = \\ & (|V_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}) \text{ choose } (|V_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1) \\ & z^2. \end{aligned}$$

*Proof.* Let

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$$P : V_i^{\text{EXTERNAL}}, E_i, CENTER, E_j.$$

be a longest path taken a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned} & V_i^{\text{EXTERNAL}} \sim V_j^{\text{EXTERNAL}} \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}} \in E_z \equiv \\ & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{\text{EXTERNAL}}, V_j^{\text{EXTERNAL}}\} \subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. ■

136EXM20a

**Example 40.0.9.** In the Figure (30.3), the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , in the Neutrosophic SuperHyperModel (30.3), is the Neutrosophic SuperHyperTotal.

**Proposition 40.0.10.** Assume a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} \\ & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal\ SuperHyperPolynomial} \\ &= z^{\min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperTotal\ SuperHyperPolynomial} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{Neutrosophic\ Cardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . There’s a new way to redefine as

$$\begin{aligned} V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. Then there’s no at least one SuperHyperTotal. Thus the notion of quasi may be up but the SuperHyperNotions

based on SuperHyperTotal could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperTotal taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

The latter is straightforward. ■ 5466

136EXM21a

**Example 40.0.11.** In the Neutrosophic Figure (30.4), the connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ , is Neutrosophic highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ , in the Neutrosophic SuperHyperModel (30.4), is the Neutrosophic SuperHyperTotal.

**Proposition 40.0.12.** Assume a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} \\ & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal\ SuperHyperPolynomial} \\ &= z^{\min |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{Neutrosophic\ Quasi-SuperHyperTotal\ SuperHyperPolynomial} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{Neutrosophic\ Cardinality}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{ choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let

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$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperTotal taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

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$$V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. Then there's no at least one SuperHyperTotal. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperTotal could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

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$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

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$$P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

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136EXM22a

**Example 40.0.13.** In the Figure (30.5), the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (30.5), is the Neutrosophic SuperHyperTotal.

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**Proposition 40.0.14.** Assume a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . Then,

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$$\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal} = \{E_i, E_j \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperTotal\ SuperHyperPolynomial} \\ = |i(i-1) \mid E_i \in E_{ESHG:(V,E)}^*|_{Neutrosophic\ Cardinality} z^2.$$

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic } R\text{-SuperHyperTotal}} &= \{CENTER, V_j \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic } R\text{-SuperHyperTotal SuperHyperPolynomial}} &= \\ (|V_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}}) \text{ choose } &(|V_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1) \\ z^2. \end{aligned}$$

*Proof.* Let

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$$P : V_i^{EXTERNAL}, E_i^*, CENTER, E_j.$$

is a longest SuperHyperTotal taken from a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . There's a new way to redefine as

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$$\begin{aligned} V_i^{EXTERNAL} \sim V_j^{EXTERNAL} &\equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} &\in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} &\subseteq E_z. \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperTotal. The latter is straightforward. Then there's at least one SuperHyperTotal. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperTotal could be applied. The unique embedded SuperHyperTotal proposes some longest SuperHyperTotal excerpt from some representatives. The latter is straightforward. ■

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136EXM23a

**Example 40.0.15.** In the Neutrosophic Figure (30.6), the connected Neutrosophic SuperHyperWheel  $NSHW : (V, E)$ , is Neutrosophic highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ , in the Neutrosophic SuperHyperModel (30.6), is the Neutrosophic SuperHyperTotal.

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## Neutrosophic SuperHyperConnected But As The Extensions Excerpt From Dense And Super Forms

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**Definition 41.0.1.** (Different Neutrosophic Types of Neutrosophic SuperHyperConnected). 5512  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 5513  
 Neutrosophic SuperHyperSet  $V' = \{V_1, V_2, \dots, V_s\}$  and  $E' = \{E_1, E_2, \dots, E_z\}$ . Then either  $V'$  5514  
 or  $E'$  is called 5515

(i) **Neutrosophic e-SuperHyperConnected** if  $\forall E_i \in E_{NSHG:(V,E)} \setminus E', \exists E_j \in E'$ , such 5516  
 that  $V_a \in E_i, E_j$ ; and  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; 5517

(ii) **Neutrosophic re-SuperHyperConnected** if  $\forall E_i \in E_{NSHG:(V,E)} \setminus E', \exists E_j \in$  5518  
 $E'$ , such that  $V_a \in E_i, E_j$ ;  $\forall E_i, E_j \in E'$ , such that  $V_a \notin E_i, E_j$ ; and 5519  
 $|E_i|_{\text{NEUTROSOPIC CARDINALITY}} = |E_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 5520

(iii) **Neutrosophic v-SuperHyperConnected** if  $\forall V_i \in E_{NSHG:(V,E)} \setminus V', \exists V_j \in V'$ , such 5521  
 that  $V_i, V_j \notin E_a$ ; and  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; 5522

(iv) **Neutrosophic rv-SuperHyperConnected** if  $\forall V_i \in E_{NSHG:(V,E)} \setminus V', \exists V_j \in V'$ , such 5523  
 that  $V_i, V_j \in E_a$ ;  $\forall V_i, V_j \in V'$ , such that  $V_i, V_j \notin E_a$ ; and  $|V_i|_{\text{NEUTROSOPIC CARDINALITY}} =$  5524  
 $|V_j|_{\text{NEUTROSOPIC CARDINALITY}}$ ; 5525

(v) **Neutrosophic SuperHyperConnected** if it's either of Neutrosophic e-SuperHyperConnected 5526  
 Neutrosophic re-SuperHyperConnected, Neutrosophic v-SuperHyperConnected, and Neut- 5527  
 rosophic rv-SuperHyperConnected. 5528

**Definition 41.0.2.** ((Neutrosophic) SuperHyperConnected). 5529  
 Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$ . Consider a 5530  
 Neutrosophic SuperHyperEdge (NSHE)  $E = \{V_1, V_2, \dots, V_s\}$ . Then  $E$  is called 5531

(i) an **Extreme SuperHyperConnected** if it's either of Neutrosophic e-SuperHyperConnected, 5532  
 Neutrosophic re-SuperHyperConnected, Neutrosophic v-SuperHyperConnected, and Neut- 5533  
 rosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph 5534  
 $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of 5535

- high Extreme cardinality of the Extreme SuperHyperEdges in the consecutive Extreme  
sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they  
form the Extreme SuperHyperConnected; 5536  
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- (ii) a **Neutrosophic SuperHyperConnected** if it's either of Neutrosophic e-  
SuperHyperConnected, Neutrosophic re-SuperHyperConnected, Neutrosophic v-  
SuperHyperConnected, and Neutrosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for a  
Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardin-  
ality of the Neutrosophic SuperHyperEdges of a Neutrosophic SuperHyperSet  $S$  of high  
Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic  
SuperHyperVertices such that they form the Neutrosophic SuperHyperConnected; 5542  
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- (iii) an **Extreme SuperHyperConnected SuperHyperPolynomial** if it's either of Neut-  
rosophic e-SuperHyperConnected, Neutrosophic re-SuperHyperConnected, Neutrosophic  
v-SuperHyperConnected, and Neutrosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for  
an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial  
contains the Extreme coefficients defined as the Extreme number of the maximum Extreme  
cardinality of the Extreme SuperHyperEdges of an Extreme SuperHyperSet  $S$  of high  
Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVer-  
tices such that they form the Extreme SuperHyperConnected; and the Extreme power is  
corresponded to its Extreme coefficient; 5546  
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- (iv) a **Neutrosophic SuperHyperConnected SuperHyperPolynomial** if it's either of 5555  
Neutrosophic e-SuperHyperConnected, Neutrosophic re-SuperHyperConnected, Neutro-  
sophic v-SuperHyperConnected, and Neutrosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  5556  
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for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPoly-  
nomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the  
maximum Neutrosophic cardinality of the Neutrosophic SuperHyperEdges of a Neutrosophic  
SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyper-  
Edges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic  
SuperHyperConnected; and the Neutrosophic power is corresponded to its Neutrosophic  
coefficient;
- (v) an **Extreme R-SuperHyperConnected** if it's either of Neutrosophic e-SuperHyperConnected  
Neutrosophic re-SuperHyperConnected, Neutrosophic v-SuperHyperConnected, and Neut-  
rosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  
 $NSHG : (V, E)$  is the maximum Extreme cardinality of an Extreme SuperHyperSet  $S$  of  
high Extreme cardinality of the Extreme SuperHyperVertices in the consecutive Extreme  
sequence of Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they  
form the Extreme SuperHyperConnected; 5565  
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- (vi) a **Neutrosophic R-SuperHyperConnected** if it's either of Neutrosophic e-  
SuperHyperConnected, Neutrosophic re-SuperHyperConnected, Neutrosophic v-  
SuperHyperConnected, and Neutrosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for a  
Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the maximum Neutrosophic cardinality  
of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high  
Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic  
SuperHyperVertices such that they form the Neutrosophic SuperHyperConnected; 5572  
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(vii) an **Extreme R-SuperHyperConnected SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperConnected, Neutrosophic re-SuperHyperConnected, Neutrosophic v-SuperHyperConnected, and Neutrosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for an Extreme SuperHyperGraph  $NSHG : (V, E)$  is the Extreme SuperHyperPolynomial contains the Extreme coefficients defined as the Extreme number of the maximum Extreme cardinality of the Extreme SuperHyperVertices of an Extreme SuperHyperSet  $S$  of high Extreme cardinality consecutive Extreme SuperHyperEdges and Extreme SuperHyperVertices such that they form the Extreme SuperHyperConnected; and the Extreme power is corresponded to its Extreme coefficient;

(viii) a **Neutrosophic SuperHyperConnected SuperHyperPolynomial** if it's either of Neutrosophic e-SuperHyperConnected, Neutrosophic re-SuperHyperConnected, Neutrosophic v-SuperHyperConnected, and Neutrosophic rv-SuperHyperConnected and  $\mathcal{C}(NSHG)$  for a Neutrosophic SuperHyperGraph  $NSHG : (V, E)$  is the Neutrosophic SuperHyperPolynomial contains the Neutrosophic coefficients defined as the Neutrosophic number of the maximum Neutrosophic cardinality of the Neutrosophic SuperHyperVertices of a Neutrosophic SuperHyperSet  $S$  of high Neutrosophic cardinality consecutive Neutrosophic SuperHyperEdges and Neutrosophic SuperHyperVertices such that they form the Neutrosophic SuperHyperConnected; and the Neutrosophic power is corresponded to its Neutrosophic coefficient.

136EXM1

**Example 41.0.3.** Assume a Neutrosophic SuperHyperGraph (NSHG)  $S$  is an ordered pair  $S = (V, E)$  in the mentioned Neutrosophic Figures in every Neutrosophic items.

- On the Figure (29.1), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_2$  is a loop Neutrosophic SuperHyperEdge and  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every given Neutrosophic SuperHyperConnected.

$$\begin{aligned} \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected SuperHyperPolynomial}} &= 3z. \end{aligned}$$

- On the Figure (29.2), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward.  $E_1, E_2$  and  $E_3$  are some empty Neutrosophic SuperHyperEdges but  $E_4$  is a Neutrosophic SuperHyperEdge. Thus in the terms of Neutrosophic SuperHyperNeighbor, there's only one Neutrosophic SuperHyperEdge, namely,  $E_4$ . The Neutrosophic SuperHyperVertex,  $V_3$  is Neutrosophic isolated means that there's no Neutrosophic SuperHyperEdge has it as a Neutrosophic endpoint. Thus the Neutrosophic SuperHyperVertex,  $V_3$ , **is** excluded in every

given Neutrosophic SuperHyperConnected.

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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.3), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5616  
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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected}} &= \{V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected SuperHyperPolynomial}} &= 3z.\end{aligned}$$

- On the Figure (29.4), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5618  
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$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected}} &= \{E_1, E_2, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected}} &= \{V_1, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 15z^2.\end{aligned}$$

- On the Figure (29.5), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5620  
5621

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected}} &= \{E_3\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected SuperHyperPolynomial}} &= 4z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected}} &= \{V_5\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.6), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5622  
5623

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 20z^{10}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected}} &= \{V_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 20z^{10}.\end{aligned}$$

- On the Figure (29.7), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5624  
5625

$$\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} = \{E_{12}, E_{13}, E_{14}\}.$$

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= z^3.\end{aligned}$$

- On the Figure (29.8), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5626  
5627

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.9), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5628  
5629

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} &= \{E_{i+1}_{i=0}^9\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 10z^{10}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected}} &= \{V_{i+1}_{i=11}^{19}, V_{22}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected SuperHyperPolynomial}} &= 20z^{10}.\end{aligned}$$

- On the Figure (29.10), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5630  
5631

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_{12}, V_{13}, V_{14}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= \\ 3 \times 4 \times 4z^3.\end{aligned}$$

- On the Figure (29.11), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5632  
5633

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_1, E_6, E_7, E_8\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 2z^4. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 3z^2.\end{aligned}$$

- On the Figure (29.12), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5634  
5635

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_1, E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= 5z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_{i=1}^{i \neq 4,5,6}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^5.\end{aligned}$$

- On the Figure (29.13), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 5636 5637

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_3, E_9, E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 3z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_1, V_5\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= 3z^2.\end{aligned}$$

- On the Figure (29.14), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 5638 5639

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.15), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 5640 5641

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_2, V_3, V_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3.\end{aligned}$$

- On the Figure (29.16), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 5642 5643

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= \\ &4 \times 3z^3.\end{aligned}$$

- On the Figure (29.17), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophicly straightforward. 5644 5645

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= \\ &4 \times 3z^4.\end{aligned}$$

- On the Figure (29.18), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5646  
5647

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_2, E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^3. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_1, V_2, V_6, V_{17}\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= \\ &2 \times 4 \times 3z^4.\end{aligned}$$

- On the Figure (29.19), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5648  
5649

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} &= \{E_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 11z^{10}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected}} &= \{V_{i+2_{i=011}}\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= 11z^{10}.\end{aligned}$$

- On the Figure (29.20), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5650  
5651

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected}} &= \{E_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme SuperHyperConnected SuperHyperPolynomial}} &= 10z. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-SuperHyperConnected SuperHyperPolynomial}} &= z.\end{aligned}$$

- On the Figure (29.21), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5652  
5653

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected}} &= \{E_2\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic SuperHyperConnected SuperHyperPolynomial}} &= z. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected}} &= \{V_1\}. \\ \mathcal{C}(NSHG)_{\text{Neutrosophic R-SuperHyperConnected SuperHyperPolynomial}} &= 10z.\end{aligned}$$

- On the Figure (29.22), the Neutrosophic SuperHyperNotion, namely, Neutrosophic SuperHyperConnected, is up. The Neutrosophic Algorithm is Neutrosophically straightforward. 5654  
5655

$$\begin{aligned}\mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected}} &= \{E_3, E_4\}. \\ \mathcal{C}(NSHG)_{\text{Extreme Quasi-SuperHyperConnected SuperHyperPolynomial}} &= z^2. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected}} &= \{V_3, V_{10}, V_6\}. \\ \mathcal{C}(NSHG)_{\text{Extreme R-Quasi-SuperHyperConnected SuperHyperPolynomial}} &= \\ &= 3 \times 6z^3.\end{aligned}$$

The previous Neutrosophic approach apply on the upcoming Neutrosophic results on Neutrosophic SuperHyperClasses. 5656  
5657

**Proposition 41.0.4.** Assume a connected Neutrosophic SuperHyperPath  $ESHG : (V, E)$ . Then 5658

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} = \\
 & = \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} \\
 & = z^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected}} \\
 & = \{V_i^{EXTERNAL}\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected SuperHyperPolynomial}} \\
 & = \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} z^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2}
 \end{aligned}$$

*Proof.* Let

5659

$$\begin{aligned}
 & P : \\
 & V_2^{EXTERNAL}, E_2, \\
 & V_3^{EXTERNAL}, E_3, \\
 & \dots, \\
 & E_{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1}, V_i^{EXTERNAL}_{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1}.
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperPath  $ESHG : (V, E)$ . There's 5660  
 a new way to redefine as 5661

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to 5662  
 $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. ■ 5663

136EXM18a

**Example 41.0.5.** In the Figure (30.1), the connected Neutrosophic SuperHyperPath  $ESHG : (V, E)$ , is highlighted and featured. The Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.1), is the SuperHyperConnected. 5664  
 5665  
 5666

**Proposition 41.0.6.** Assume a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . Then 5667

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} = \\
 & = \{E_i\}_{i=1}^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} \\
 & = (|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 1) \\
 & z^{|E_{ESHG:(V,E)}|_{\text{Neutrosophic Cardinality}} - 2}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic R-Quasi-SuperHyperConnected}}
 \end{aligned}$$

$$\begin{aligned}
 &= \{V_i^{EXTERNAL}\}_{i=1}^{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}^{-2}} \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-Quasi-SuperHyperConnected\ SuperHyperPolynomial} \\
 &= \prod |V_i^{EXTERNAL}_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}^z |E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}^{-2}
 \end{aligned}$$

*Proof.* Let

5668

$$\begin{aligned}
 &P : \\
 &V_2^{EXTERNAL}, E_2, \\
 &V_3^{EXTERNAL}, E_3, \\
 &\dots, \\
 &E_{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}^{-1}}, V_i^{EXTERNAL}_{|E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}^{-1}}
 \end{aligned}$$

be a longest path taken from a connected Neutrosophic SuperHyperCycle  $ESHG : (V, E)$ . There's a new way to redefine as

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5670

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. ■

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136EXM19a

**Example 41.0.7.** In the Figure (30.2), the connected Neutrosophic SuperHyperCycle  $NSHC : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, in the Neutrosophic SuperHyperModel (30.2), is the Neutrosophic SuperHyperConnected.

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**Proposition 41.0.8.** Assume a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . Then

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$$\begin{aligned}
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperConnected} = \{E_i \in E_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperConnected\ SuperHyperPolynomial} \\
 &= |i | E_i \in |E_{ESHG:(V,E)}|_{Neutrosophic\ Cardinality}^z. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperConnected} = \{CENTER \in V_{ESHG:(V,E)}\}. \\
 &\mathcal{C}(NSHG)_{Neutrosophic\ R-SuperHyperConnected\ SuperHyperPolynomial} = z.
 \end{aligned}$$

*Proof.* Let

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$$P : V_i^{EXTERNAL}, E_i, CENTER, E_j.$$

be a longest path taken a connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ . There's a new way to redefine as

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5679

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. ■

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5681

**Example 41.0.9.** In the Figure (30.3), the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , is highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperStar  $ESHS : (V, E)$ , in the Neutrosophic SuperHyperModel (30.3), is the Neutrosophic SuperHyperConnected.

**Proposition 41.0.10.** Assume a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Then

$$\begin{aligned}
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} \\
 &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\
 & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} \\
 &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\
 & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\
 &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperConnected}} \\
 &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}^{EXTERNAL}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}^{EXTERNAL}}, i \neq j\}. \\
 & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperConnected SuperHyperPolynomial}} \\
 &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{choose } 2) \right) = z^2.
 \end{aligned}$$

*Proof.* Let

$$\begin{aligned}
 & P : \\
 & V_1^{EXTERNAL}, E_1, \\
 & V_2^{EXTERNAL}, E_2
 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 & V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 & \exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. Then there's no at least one SuperHyperConnected. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperConnected could be applied. There are only two SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$P :$$

$$V_1^{EXTERNAL}, E_1,$$

$$V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperConnected taken from a connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$P :$$

$$V_1^{EXTERNAL}, E_1,$$

$$V_2^{EXTERNAL}, E_2$$

The latter is straightforward. ■ 5701

136EXM21a

**Example 41.0.11.** In the Neutrosophic Figure (30.4), the connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ , is Neutrosophic highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Neutrosophic Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperBipartite  $ESHB : (V, E)$ , in the Neutrosophic SuperHyperModel (30.4), is the Neutrosophic SuperHyperConnected.

**Proposition 41.0.12.** Assume a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Then

$$\begin{aligned} & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected}} \\ &= \{E_a \in E_{P_i^{ESHG:(V,E)}}, \\ & \quad \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| = \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic Quasi-SuperHyperConnected SuperHyperPolynomial}} \\ &= z^{\min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|} \\ & \text{where } \forall P_i^{ESHG:(V,E)}, |P_i^{ESHG:(V,E)}| \\ &= \min_i |P_i^{ESHG:(V,E)} \in P^{ESHG:(V,E)}|\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperConnected}} \\ &= \{V_a^{EXTERNAL} \in V_{P_i^{ESHG:(V,E)}}, V_b^{EXTERNAL} \in V_{P_j^{ESHG:(V,E)}}, i \neq j\}. \\ & \mathcal{C}(NSHG)_{\text{Neutrosophic V-SuperHyperConnected SuperHyperPolynomial}} \\ &= \sum_{|V_{ESHG:(V,E)}^{EXTERNAL}|_{\text{Neutrosophic Cardinality}}} = \left( \sum_{i=|P^{ESHG:(V,E)}|} (|P_i^{ESHG:(V,E)}| \text{ choose } 2) \right) = z^2. \end{aligned}$$

*Proof.* Let

5710

$$P :$$

$$V_1^{EXTERNAL}, E_1,$$

$$V_2^{EXTERNAL}, E_2$$

is a longest SuperHyperConnected taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . There's a new way to redefine as

$$\begin{aligned} V_i^{EXTERNAL} &\sim V_j^{EXTERNAL} \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, & V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\ \exists! E_z \in E_{ESHG:(V,E)}, & \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z. \end{aligned}$$

The term "EXTERNAL" implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. Then there's no at least one SuperHyperConnected. Thus the notion of quasi may be up but the SuperHyperNotions based on SuperHyperConnected could be applied. There are only  $z'$  SuperHyperParts. Thus every SuperHyperPart could have one SuperHyperVertex as the representative in the

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . Thus only some SuperHyperVertices and only minimum-Neutrosophic-of-SuperHyperPart SuperHyperEdges are attained in any solution

$$\begin{aligned} P : \\ V_1^{EXTERNAL}, E_1, \\ V_2^{EXTERNAL}, E_2 \end{aligned}$$

is a longest path taken from a connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ . The latter is straightforward. ■

136EXM22a

**Example 41.0.13.** In the Figure (30.5), the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , is highlighted and Neutrosophic featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous Neutrosophic result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperMultipartite  $ESHM : (V, E)$ , in the Neutrosophic SuperHyperModel (30.5), is the Neutrosophic SuperHyperConnected.

**Proposition 41.0.14.** Assume a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . Then,

$$\begin{aligned} \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperConnected} &= \{E_i \in E_{ESHG:(V,E)}^*\}. \\ \mathcal{C}(NSHG)_{Neutrosophic\ SuperHyperConnected\ SuperHyperPolynomial} \\ &= |i | E_i \in |E_{ESHG:(V,E)}^*|_{Neutrosophic\ Cardinality}|z. \\ \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperConnected} &= \{CENTER \in V_{ESHG:(V,E)}\}. \\ \mathcal{C}(NSHG)_{Neutrosophic\ V-SuperHyperConnected\ SuperHyperPolynomial} &= z. \end{aligned}$$

*Proof.* Let

$$P : V^{EXTERNAL}_i, E^*_i, CENTER, E_j.$$

is a longest SuperHyperConnected taken from a connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ . There's a new way to redefine as

$$\begin{aligned}
 &V_i^{EXTERNAL} \sim V_j^{EXTERNAL} \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, V_i^{EXTERNAL}, V_j^{EXTERNAL} \in E_z \equiv \\
 &\exists! E_z \in E_{ESHG:(V,E)}, \{V_i^{EXTERNAL}, V_j^{EXTERNAL}\} \subseteq E_z.
 \end{aligned}$$

The term “EXTERNAL” implies  $|N(V_i^{EXTERNAL})| \geq |N(V_j)|$  where  $V_j$  is corresponded to  $V_i^{EXTERNAL}$  in the literatures of SuperHyperConnected. The latter is straightforward. Then there's at least one SuperHyperConnected. Thus the notion of quasi isn't up and the SuperHyperNotions based on SuperHyperConnected could be applied. The unique embedded SuperHyperConnected proposes some longest SuperHyperConnected excerpt from some representatives. The latter is straightforward. ■

136EXM23a

**Example 41.0.15.** In the Neutrosophic Figure (30.6), the connected Neutrosophic SuperHyperWheel  $NSHW : (V, E)$ , is Neutrosophic highlighted and featured. The obtained Neutrosophic SuperHyperSet, by the Algorithm in previous result, of the Neutrosophic SuperHyperVertices of the connected Neutrosophic SuperHyperWheel  $ESHW : (V, E)$ , in the Neutrosophic SuperHyperModel (30.6), is the Neutrosophic SuperHyperConnected.



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## CHAPTER 42

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# Books' Contributions

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“Books' Contributions”:   Featured Threads	5881
Book #108	5882
Title: SuperHyperDomination	5883
#Latest_Updates	5884
#The_Links	5885
Available at WordPress Preprints_org ResearchGate Scribd academia ZENODO_ORG Twitter	5886
LinkedIn Amazon googlebooks GooglePlay	5887
–	5888
	5889
#Latest_Updates	5890
	5891
#The_Links	5892
	5893
Book #108	5894
	5895
Title: SuperHyperDomination	5896
	5897
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	5900
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	5902
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ISBN	5910
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(Kindle Edition): CC BY-NC-ND 4.0	5913

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Print length	5918
(Paperback): - pages	5919
(Hardcover): - pages	5920
(Kindle Edition): - pages	5921
(E-Book): 418 pages	5922
–	5923
–	5924
–	5925
#Latest_Updates	5926
–	5927
#The_Links	5928
–	5929
ResearchGate: <a href="https://www.researchgate.net/publication/-">https://www.researchgate.net/publication/-</a>	5930
–	5931
WordPress: <a href="https://drhenrygarrett.wordpress.com/2023/02/18/SuperHyperDomination/">https://drhenrygarrett.wordpress.com/2023/02/18/SuperHyperDomination/</a>	5932
–	5933
@Scribd: <a href="https://www.scribd.com/document/-">https://www.scribd.com/document/-</a>	5934
–	5935
academia: <a href="https://www.academia.edu/-">https://www.academia.edu/-</a>	5936
–	5937
ZENODO_ORG: <a href="https://zenodo.org/record/-">https://zenodo.org/record/-</a>	5938
–	5939
googlebooks: <a href="https://books.google.com/books/about?id=-">https://books.google.com/books/about?id=-</a>	5940
–	5941
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## SuperHyperDominating

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February 18, 2023	5950
Posted in 0108   SuperHyperDomination	5951
Tags:	5952
Applications, Applied Mathematics, Applied Research, Cancer, Cancer’s Recognitions, Combinatorics, Edge, Edges, Graph Theory, Graphs, Latest Research, Literature Reviews, Modeling, Neutrosophic Graph, Neutrosophic Graph Theory, Neutrosophic Science, Neutrosophic SuperHyperClasses, Neutrosophic SuperHyperGraph, Neutrosophic SuperHyperGraph Theory, neutrosophic SuperHyperGraphs, Neutrosophic SuperHyperDomination, Open Problems, Open Questions, Problems, Pure Math, Pure Mathematics, Questions, Real-World Applications, Recent Research, Recognitions, Research, scientific research Article, scientific research Articles, scientific research Book, scientific research Chapter, scientific research Chapters, Review, SuperHyperClasses, SuperHyperEdges, SuperHyperGraph, SuperHyperGraph Theory, SuperHyperGraphs, SuperHyperDomination, SuperHyperModeling, SuperHyperVertices, Theoretical Research, Vertex, Vertices.	5953
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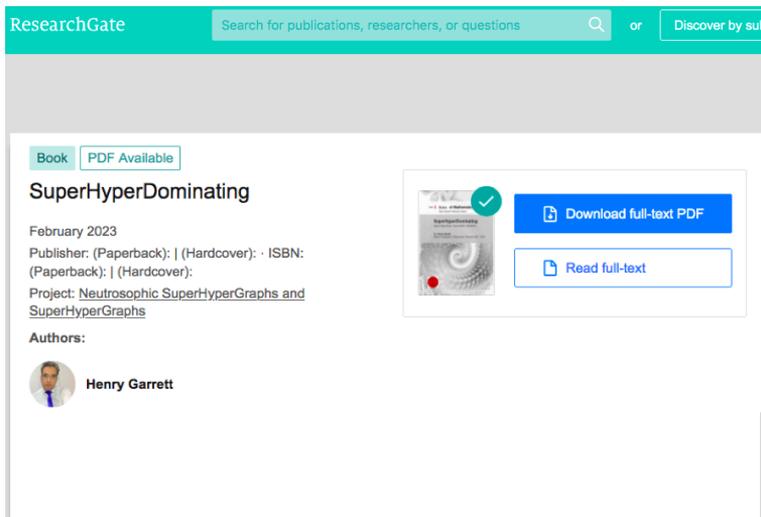


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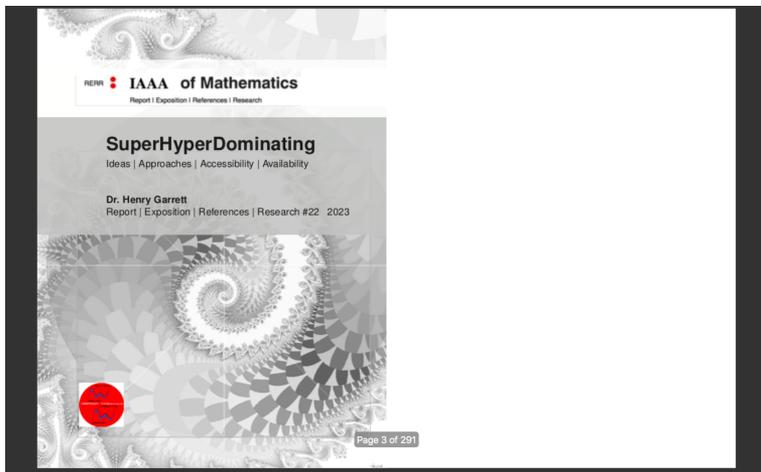


Figure 42.3: “#108th Book” || SuperHyperDomination February 2023 License: CC BY-NC-ND 4.0 Print length: 418 pages Project: Neutrosophic SuperHyperGraphs and SuperHyperGraphs

In this scientific research book, there are some scientific research chapters on “Extreme SuperHyperDomination” and “Neutrosophic SuperHyperDomination” about some researches on Extreme SuperHyperDomination and neutrosophic SuperHyperDomination.

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## CHAPTER 43

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### **“SuperHyperGraph-Based Books”: | Featured Tweets**

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“SuperHyperGraph-Based Books”: | Featured Tweets

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Project

ResearchGate

## Neutrosophic SuperHyperGraphs and SuperHyperGraphs

 Henry Garrett

Goal: The aim of this project is to contribute some research articles and some research books in that subject. Finding tools and notions to define in this structure to make this structure more understandable. Clarifications are presented in oversimplified ways. There are well-defined efforts to get more sensible results.

Sometimes, I post one part of book at my website. After that, I put that link in this project. Some research articles and some research books are excerpt from these posts.

Instance updates are on my accounts, simultaneously [Website, Scribd, Twitter, Amazon, Academia, LinkedIn, Twitter, ResearchGate].

I've listed my accounts below.

-My website [Covering all my contributions containing articles and books as free access to download with PDF extension and more]: <https://drhenrygarrett.wordpress.com>

-Amazon [Some of my all books, here]: <https://www.amzn.com/author/drhenrygarrett>

-Twitter: @DrHenryGarrett ([www.twitter.com/DrHenryGarrett](http://www.twitter.com/DrHenryGarrett))

-ResearchGate: <https://www.researchgate.net/profile/Henry-Garrett-2>

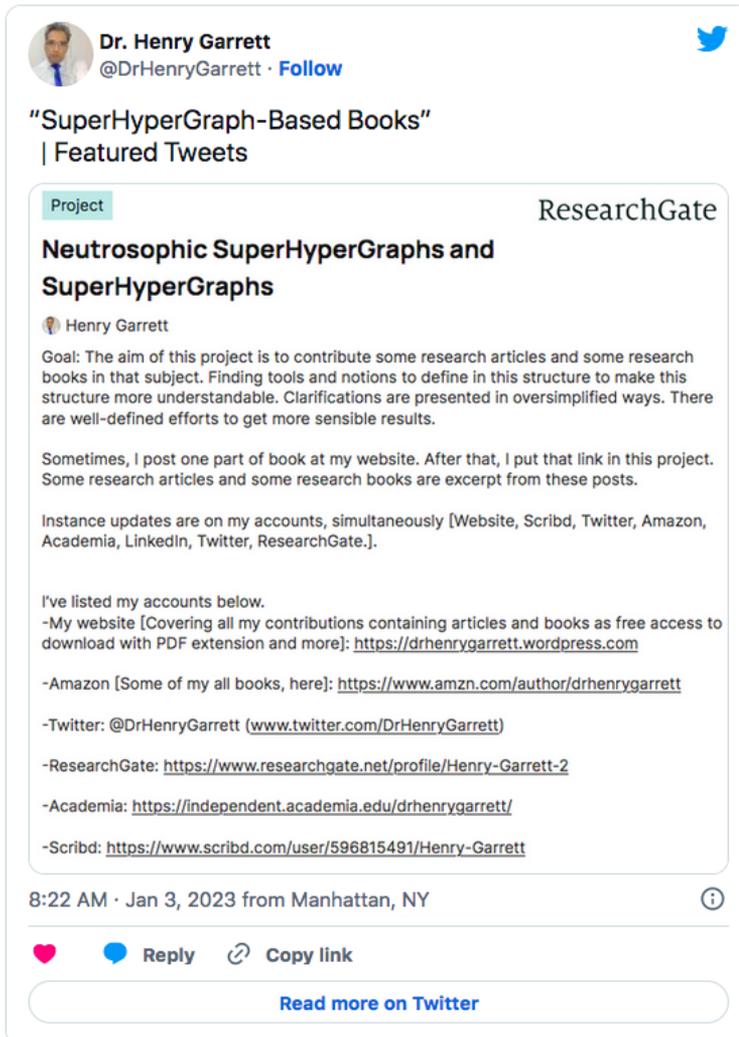
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Figure 43.1: “SuperHyperGraph-Based Books”: | Featured Tweets



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**“SuperHyperGraph-Based Books”**  
| Featured Tweets

Project ResearchGate

### Neutrosophic SuperHyperGraphs and SuperHyperGraphs

Henry Garrett

Goal: The aim of this project is to contribute some research articles and some research books in that subject. Finding tools and notions to define in this structure to make this structure more understandable. Clarifications are presented in oversimplified ways. There are well-defined efforts to get more sensible results.

Sometimes, I post one part of book at my website. After that, I put that link in this project. Some research articles and some research books are excerpt from these posts.

Instance updates are on my accounts, simultaneously [Website, Scribd, Twitter, Amazon, Academia, LinkedIn, Twitter, ResearchGate].

I've listed my accounts below.

- My website [Covering all my contributions containing articles and books as free access to download with PDF extension and more]: <https://drhenrygarrett.wordpress.com>
- Amazon [Some of my all books, here]: <https://www.amzn.com/author/drhenrygarrett>
- Twitter: @DrHenryGarrett ([www.twitter.com/DrHenryGarrett](http://www.twitter.com/DrHenryGarrett))
- ResearchGate: <https://www.researchgate.net/profile/Henry-Garrett-2>
- Academia: <https://independent.academia.edu/drhenrygarrett/>
- Scribd: <https://www.scribd.com/user/596815491/Henry-Garrett>

8:22 AM · Jan 3, 2023 from Manhattan, NY

Reply Copy link

[Read more on Twitter](#)

Figure 43.2: “SuperHyperGraph-Based Books”: | Featured Tweets



Figure 43.3: "SuperHyperGraph-Based Books": | Featured Tweets #69



Figure 43.4: "SuperHyperGraph-Based Books": | Featured Tweets #69

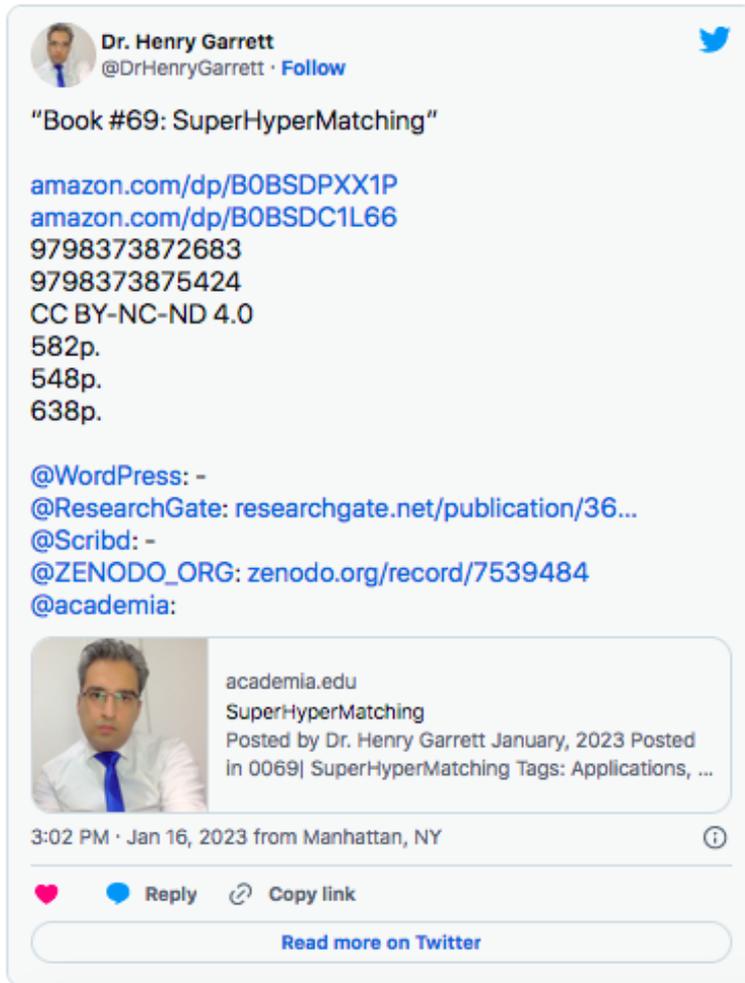


Figure 43.5: "SuperHyperGraph-Based Books": | Featured Tweets #69

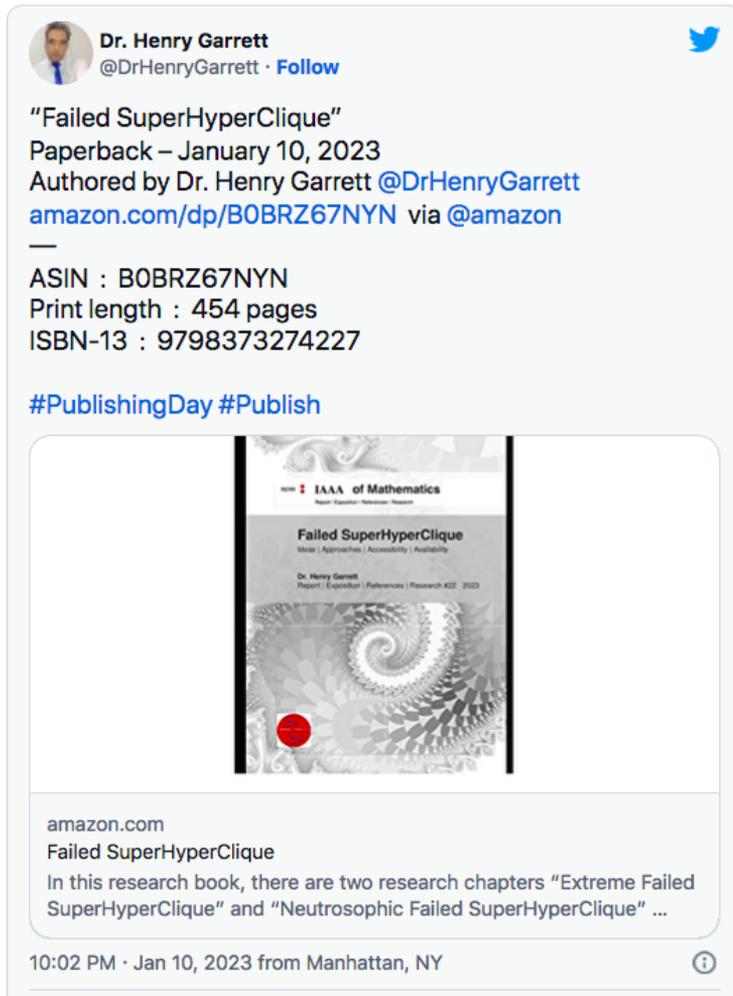


Figure 43.6: “SuperHyperGraph-Based Books”: | Featured Tweets #68



Figure 43.7: “SuperHyperGraph-Based Books”: | Featured Tweets #68

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

Book #68

Failed SuperHyperClique

[@WordPress: drhenrygarrett.wordpress.com/2023/01/11/fai...](https://drhenrygarrett.wordpress.com/2023/01/11/fai...)  
[@ResearchGate: researchgate.net/publication/36...](https://researchgate.net/publication/36...)  
[@Scribd:](https://scibid.com)  
[@academia: academia.edu/94736027](https://academia.edu/94736027)  
[@ZENODO\\_ORG: zenodo.org/record/7523390](https://zenodo.org/record/7523390)

—

[amazon.com/dp/BOBRZ67NYN](https://amazon.com/dp/BOBRZ67NYN)  
[amazon.com/dp/BOBRYZTK24](https://amazon.com/dp/BOBRYZTK24)  
9798373274227  
9798373277273

Failed SuperHyperClique  
Henry Garrett

IAAA of Mathematics  
Report | Exposition | References | Research #22 2023

Failed SuperHyperClique  
Ideas | Approaches | Accessibility | Availability

Dr. Henry Garrett  
Report | Exposition | References | Research #22 2023

drhenrygarrett.wordpress.com  
Failed SuperHyperClique (Published Version)  
"Hardcover" ASIN : BOBRYZTK24 | Print length : 460 pages |  
ISBN-13 : 9798373277273 | "Paperback" ASIN : BOBRZ67NYN | ...

9:54 PM · Jan 13, 2023 from Manhattan, NY

Figure 43.8: "SuperHyperGraph-Based Books": | Featured Tweets #68

Publications: Books

2023 0068 | Failed SuperHyperClique Amazon

- ▶ ASIN : B0BRZ67NYN Publisher : Independently published (January 10, 2023) Language : English Paperback : 454 pages ISBN-13 : 979-8373274227 Item Weight : 2.83 pounds Dimensions : 8.5 x 1.07 x 11 inches
- ▶ ASIN : B0BRYZTK24 Publisher : Independently published (January 10, 2023) Language : English Hardcover : 460 pages ISBN-13 : 979-837327273 Item Weight : 2.78 pounds Dimensions : 8.25 x 1.27 x 11 inches

Figure 43.9: “SuperHyperGraph-Based Books”: | Featured Tweets #68

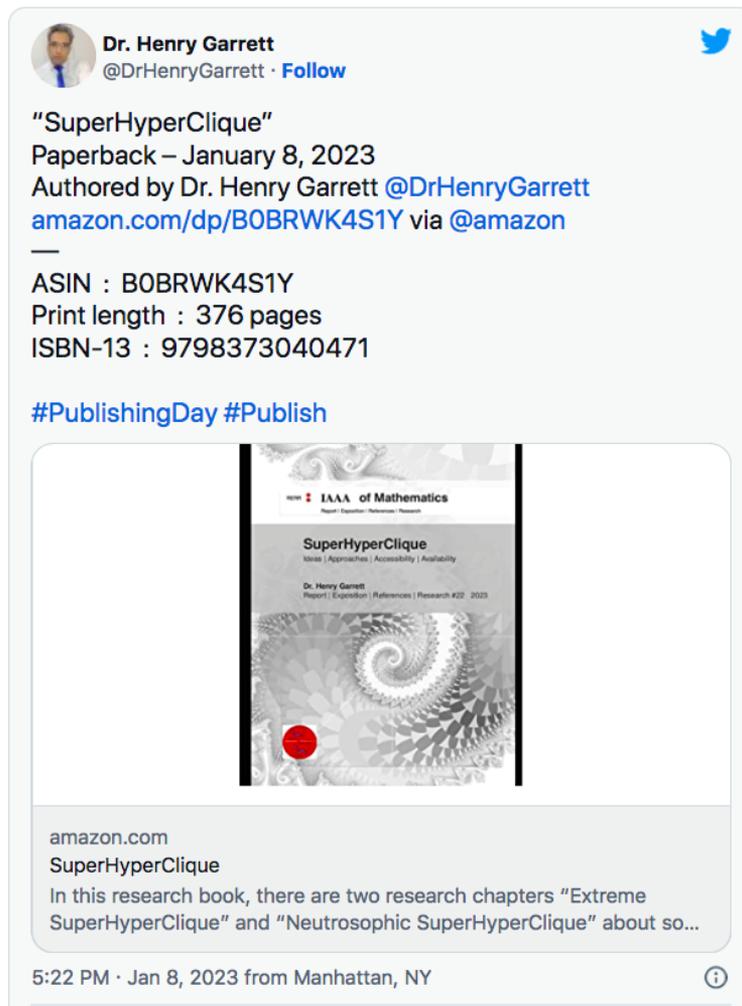


Figure 43.10: “SuperHyperGraph-Based Books”: | Featured Tweets #67

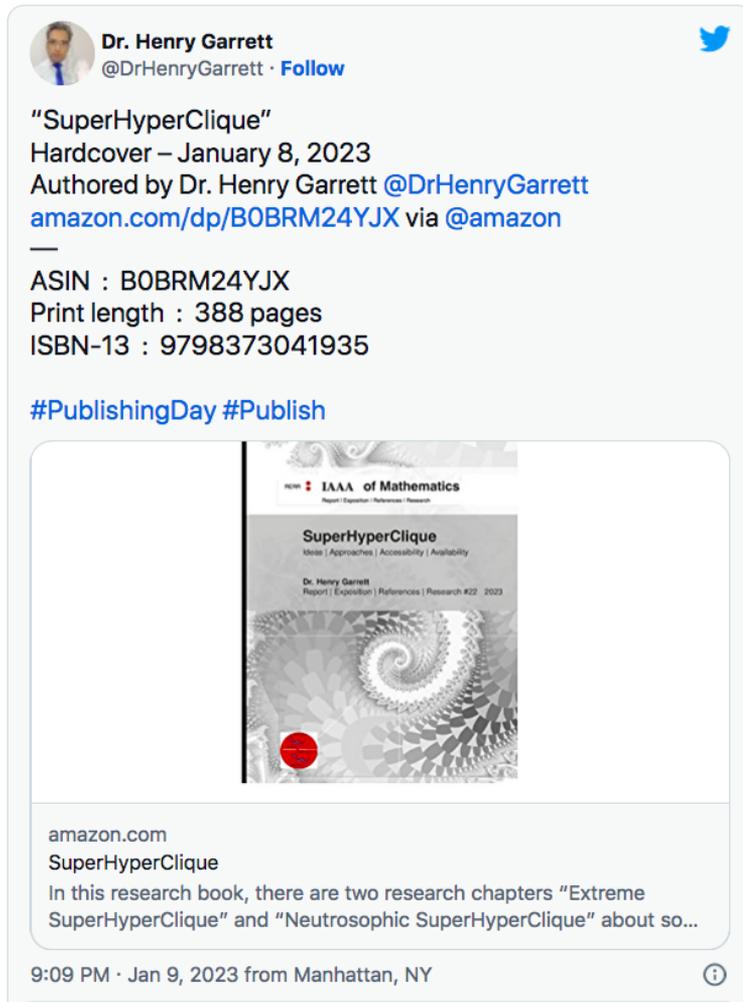


Figure 43.11: “SuperHyperGraph-Based Books”: | Featured Tweets #67



Publications: Books

2023 0067 | SuperHyperClique Amazon

» ASIN : B0BRWK4S1Y Publisher : Independently published (January 8, 2023) Language : English Paperback : 376 pages ISBN-13 : 979-8373040471 Item Weight : 2.36 pounds Dimensions : 8.5 x 0.89 x 11 inches

» ASIN : B0BRM24YJX Publisher : Independently published (January 8, 2023) Language : English Hardcover : 388 pages ISBN-13 : 979-8373041935 Item Weight : 2.36 pounds Dimensions : 8.25 x 1.1 x 11 inches

Figure 43.13: “SuperHyperGraph-Based Books”: | Featured Tweets #67



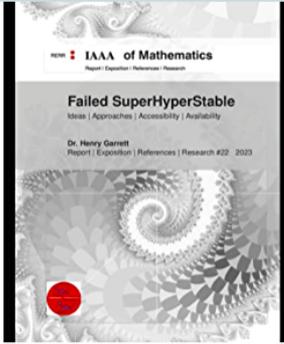
**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

“Failed SuperHyperStable”  
Paperback – January 4, 2023  
Authored by Dr. Henry Garrett @DrHenryGarrett  
[amazon.com/dp/B0BRNG7DC8](https://amazon.com/dp/B0BRNG7DC8) via @amazon

—

ASIN : B0BRNG7DC8  
Print length : 304 pages  
ISBN-13 : 9798372597976

#PublishingDay #Publish



amazon.com  
Failed SuperHyperStable  
In this research book, there are two research chapters “Extreme Failed SuperHyperStable” and “Neutrosophic Failed SuperHyperStable” ...

11:22 PM · Jan 5, 2023 from Manhattan, NY

Figure 43.14: “SuperHyperGraph-Based Books”: | Featured Tweets #66

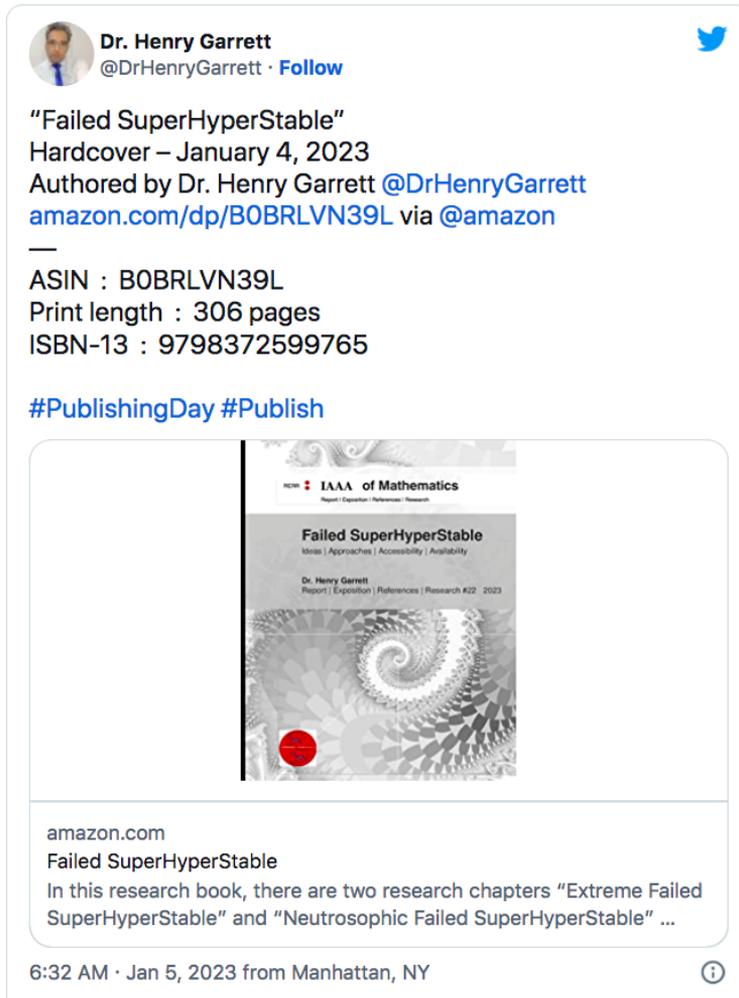


Figure 43.15: "SuperHyperGraph-Based Books": | Featured Tweets #66



Figure 43.16: “SuperHyperGraph-Based Books”: | Featured Tweets #66

**Dr. Henry Garrett**  
 @DrHenryGarrett · Follow

**Book #66**  
**Failed SuperHyperStable**

[amazon.com/dp/B0BRNG7DC8](https://amazon.com/dp/B0BRNG7DC8)  
[amazon.com/dp/B0BRLVN39L](https://amazon.com/dp/B0BRLVN39L)  
 9798372597976  
 9798372599765

@ResearchGate: [researchgate.net/publication/36...](https://researchgate.net/publication/36...)  
 @Scribd: -  
 @academia: [academia.edu/94347021](https://academia.edu/94347021)  
 @ZENODO\_ORG: [zenodo.org/record/7504782](https://zenodo.org/record/7504782)  
 @WordPress:

drhenrygarrett.wordpress.com  
**Failed SuperHyperStable (Published Version)**  
 "Hardcover" ASIN : B0BRLVN39L | Print length : 306 pages |  
 ISBN-13 : 979-8372599765 | "Paperback" ASIN : B0BRNG7DC8 | ...

5:52 AM · Jan 6, 2023 from Manhattan, NY

Figure 43.17: "SuperHyperGraph-Based Books": | Featured Tweets #66

Publications: Books

2023	0066   Failed SuperHyperStable	Amazon
------	--------------------------------	--------

- ASIN : B0BRNG7DC8 Publisher : Independently published (January 4, 2023) Language : English Paperback : 304 pages ISBN-13 : 979-8372597976 Item Weight : 1.93 pounds Dimensions : 8.5 x 0.72 x 11 inches
- ASIN : B0BRLVN39L Publisher : Independently published (January 4, 2023) Language : English Hardcover : 306 pages ISBN-13 : 979-8372599765 Item Weight : 1.89 pounds Dimensions : 8.25 x 0.91 x 11 inches

Figure 43.18: "SuperHyperGraph-Based Books": | Featured Tweets #66

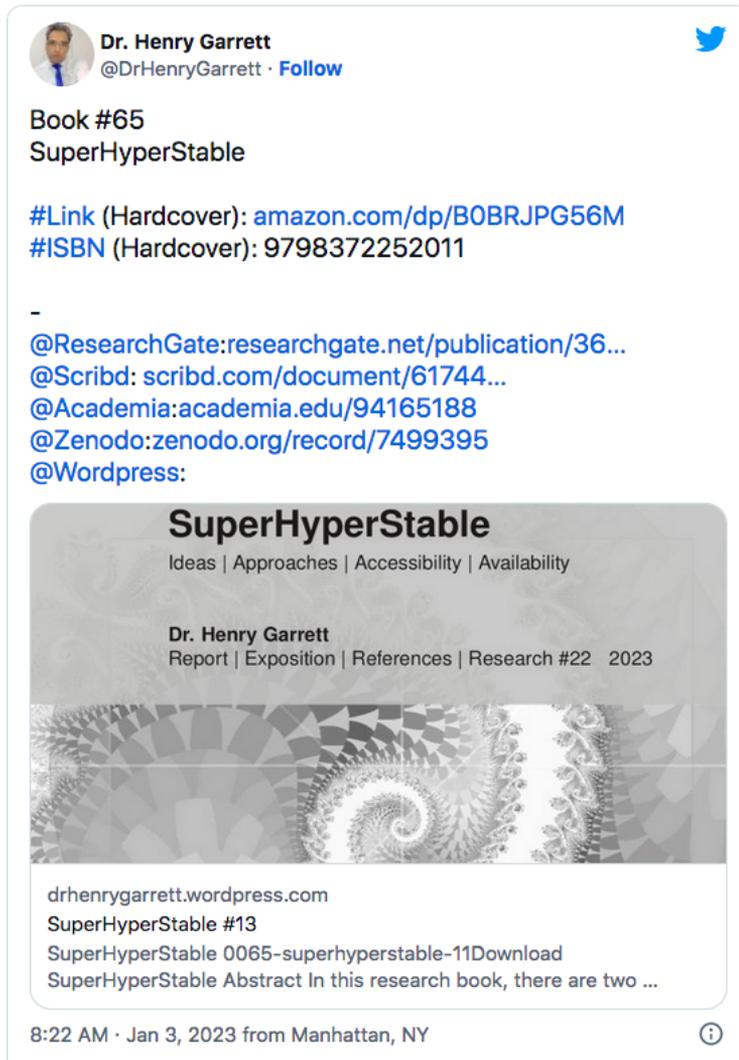


Figure 43.19: “SuperHyperGraph-Based Books”: | Featured Tweets #65

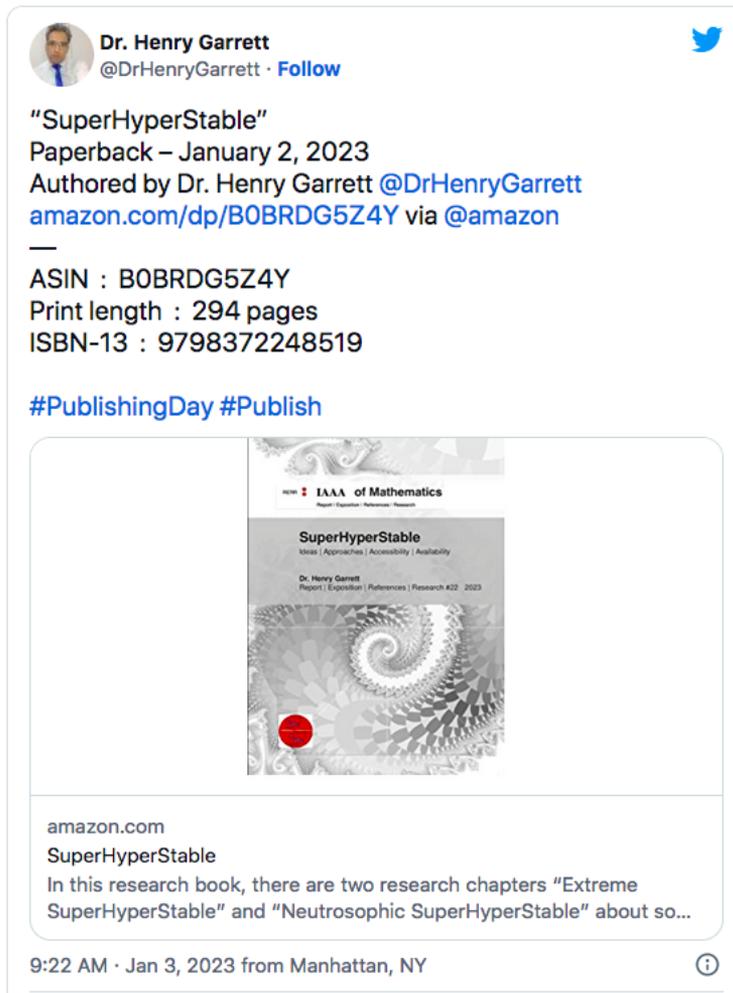


Figure 43.20: “SuperHyperGraph-Based Books”: | Featured Tweets #65

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

**"SuperHyperStable"**  
Paperback – January 2, 2023  
Authored by Dr. Henry Garrett @DrHenryGarrett  
[amazon.com/dp/BOBRDG5Z4Y](https://amazon.com/dp/BOBRDG5Z4Y) via @amazon

—

ASIN : BOBRDG5Z4Y  
Print length : 294 pages  
ISBN-13 : 9798372248519

#PublishingDay #Publish

9:22 AM · Jan 3, 2023 from Manhattan, NY

Figure 43.21: “SuperHyperGraph-Based Books”: | Featured Tweets #65



Figure 43.22: “SuperHyperGraph-Based Books”: | Featured Tweets #65

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

**"SuperHyperStable"**  
Hardcover – January 2, 2023  
Authored by Dr. Henry Garrett @DrHenryGarrett  
[amazon.com/dp/BOBRJPG56M](https://amazon.com/dp/BOBRJPG56M) via @amazon

ASIN : BOBRJPG56M  
Print length : 290 pages  
ISBN-13 : 9798372252011

#PublishingDay #Publish

6:52 AM · Jan 3, 2023 from Manhattan, NY

Reply Copy link

[Read more on Twitter](#)

Figure 43.23: “SuperHyperGraph-Based Books”: | Featured Tweets #65

The image is a screenshot of a tweet from Dr. Henry Garrett (@DrHenryGarrett). The tweet is dated Jan 3, 2023, at 10:22 AM from Manhattan, NY. The tweet content includes:  
- Profile picture and name: Dr. Henry Garrett, @DrHenryGarrett, Follow.  
- Book title: Book #65 SuperHyperStable.  
- Amazon links: amazon.com/dp/BOBRDG5Z4Y and amazon.com/dp/BOBRJPG56M.  
- ISBNs: 9798372248519 | 9798372252011.  
- ResearchGate link: @ResearchGate:researchgate.net/publication/36...  
- Scribd link: @Scribd: scribd.com/document/61744...  
- Academia link: @Academia:academia.edu/94165188  
- Zenodo link: @Zenodo:zenodo.org/record/7499395  
- Wordpress link: @Wordpress:  
- Two book covers for 'SuperHyperStable' by Henry Garrett. The left cover is black with white text and a small photo of the author. The right cover is white with a grey fractal pattern and the IAAA of Mathematics logo.  
- A link to drhenrygarrett.wordpress.com.  
- Book details: SuperHyperStable (Published Version), "Hardcover" ASIN : BOBRJPG56M | Print length : 290 pages | ISBN-13 : 9798372252011 | "Paperback" ASIN : BOBRDG5Z4Y | ...  
- A small information icon in the bottom right corner of the tweet.

Figure 43.24: “SuperHyperGraph-Based Books”: | Featured Tweets #65

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

#64  
Failed SuperHyperForcing

[amazon.com/dp/B0BRH5B4QM](https://amazon.com/dp/B0BRH5B4QM) | [amazon.com/dp/B0BRGX4DBJ](https://amazon.com/dp/B0BRGX4DBJ) 9798372123649 | 9798372124509

[@ResearchGate:researchgate.net/publication/36...](https://researchgate.net/publication/36...)  
[@Scribd:scribd.com/document/61724...](https://scribd.com/document/61724...)  
[@Academia:academia.edu/94069071](https://academia.edu/94069071)  
[@Zenodo:zenodo.org/record/7497450](https://zenodo.org/record/7497450)  
[@Wordpress:](#)

Failed SuperHyperForcing  
Henry Garrett

drhenrygarrett.wordpress.com  
Failed SuperHyperForcing (Published Version)  
Hardcover : 337 pages | ASIN : B0BRGX4DBJ | ISBN-13 : 9798372124509 | Paperback : 337 pages | ASIN : B0BRH5B4QM | ...

8:22 AM · Jan 3, 2023 from Manhattan, NY

Figure 43.25: “SuperHyperGraph-Based Books”: | Featured Tweets #64

The image is a screenshot of a tweet from Dr. Henry Garrett (@DrHenryGarrett). The tweet is dated 8:22 AM on Jan 3, 2023, from Manhattan, NY. It features a profile picture of Dr. Garrett and a blue 'Follow' button. The main text of the tweet reads: 'Book #63 SuperHyperForcing'. Below this, there are two Amazon links: 'amazon.com/dp/BOBRDG1KN1 | amazon.com/dp/BOBRDFFQMF' and the ISBN '9798371873347 | 9798371874092'. A list of social media links follows: '@ResearchGate:researchgate.net/publication/36...', '@Scribd:scribd.com/document/61707...', '@Academia:academia.edu/93995226', '@Zenodo:zenodo.org/record/7494862', and '@Wordpress:'. The central part of the tweet contains two book covers. The left cover is for 'SuperHyperForcing' by Henry Garrett, published by IAA of Mathematics. The right cover is for 'SuperHyperForcing' by Dr. Henry Garrett, also published by IAA of Mathematics. Below the covers, the tweet provides the website 'drhenrygarrett.wordpress.com', the title 'SuperHyperForcing (Published Version)', and ASIN/ISBN information for both hardcover and paperback editions. The tweet ends with a small information icon.

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

Book #63  
SuperHyperForcing

[amazon.com/dp/BOBRDG1KN1](https://amazon.com/dp/BOBRDG1KN1) | [amazon.com/dp/BOBRDFFQMF](https://amazon.com/dp/BOBRDFFQMF)  
9798371873347 | 9798371874092

@ResearchGate:researchgate.net/publication/36...  
@Scribd:scribd.com/document/61707...  
@Academia:academia.edu/93995226  
@Zenodo:zenodo.org/record/7494862  
@Wordpress:

**SuperHyperForcing**  
Henry Garrett

**SuperHyperForcing**  
Ideas | Approaches | Accessibility | Availability  
Dr. Henry Garrett  
Report | Exposition | References | Research #22 2022

drhenrygarrett.wordpress.com  
SuperHyperForcing (Published Version)  
|Hardcover| ASIN : B0BRDFFQMF | ISBN-13 : 9798371873347 |  
Paperback : 285 | |Paperback| ASIN : BOBRDG1KN1 | ISBN-13 : ...

8:22 AM · Jan 3, 2023 from Manhattan, NY

Figure 43.26: “SuperHyperGraph-Based Books”: | Featured Tweets #63

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

Book#62  
SuperHyperAlliances  
[amazon.com/dp/B0BR6YC3HG](https://amazon.com/dp/B0BR6YC3HG) | [amazon.com/dp/B0BR7CBTC6](https://amazon.com/dp/B0BR7CBTC6)  
9798371488343 | 9798371494849

-

[@ResearchGate:researchgate.net/publication/36...](https://ResearchGate:researchgate.net/publication/36...)  
[@Scribd:scribd.com/document/61702...](https://Scribd:scribd.com/document/61702...)  
[@Academia:academia.edu/93968814](https://Academia:academia.edu/93968814)  
[@Zenodo:zenodo.org/record/7493845](https://Zenodo:zenodo.org/record/7493845)  
[@WordPress:](https://WordPress:drhenrygarrett.wordpress.com)

The image shows the front and back covers of the book 'SuperHyperAlliances'. The front cover features a complex geometric pattern of overlapping triangles forming a spiral, with the title 'SuperHyperAlliances' and author 'Dr. Henry Garrett' prominently displayed. The back cover contains a detailed description of the book's content, including its focus on 'Modified Hypergraphs' and 'SuperHyperGraphs', and lists various mathematical and scientific applications. It also includes the publisher's information: 'IAAA of Mathematics, Report | Exposition | References | Research #22 2022'.

drhenrygarrett.wordpress.com  
SuperHyperAlliances (Published Version)  
Hardcover: ASIN : B0BR7CBTC6 | Hardcover : 189 pages | ISBN-13 : 979-8371494849 | Paperback: ASIN : B0BR6YC3HG | Paperback : ...

8:22 AM · Jan 3, 2023 from Manhattan, NY

Figure 43.27: “SuperHyperGraph-Based Books”: | Featured Tweets #62

The image shows a tweet from Dr. Henry Garrett (@DrHenryGarrett) dated Jan 3, 2023. The tweet is titled "#61 SuperHyperGraphs" and includes several links to purchase the book on Amazon, ResearchGate, Scribd, Academia, and Zenodo, as well as a link to the book's WordPress page. The book cover for "SuperHyperGraphs" is displayed, featuring a fractal-like geometric pattern. The cover text includes the publisher "IAAA of Mathematics" and the author "Dr. Henry Garrett".

**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

#61 SuperHyperGraphs

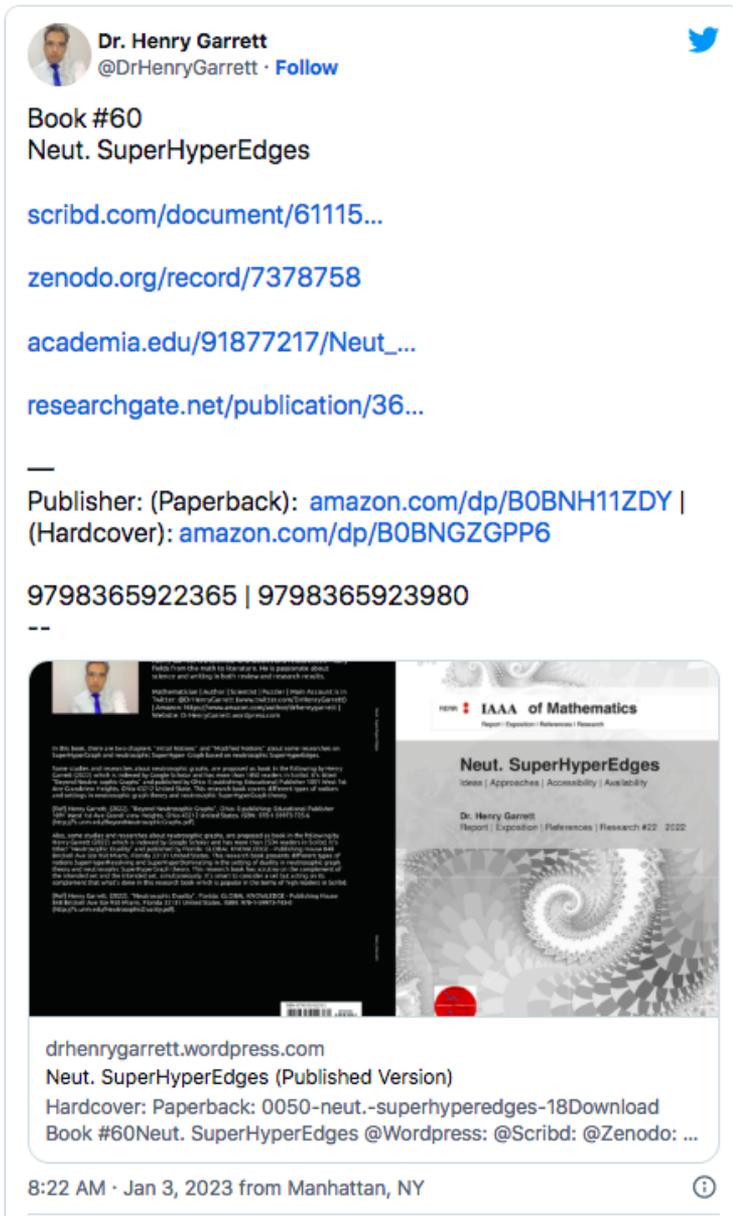
amazon.com/dp/BOBR1NH4Z | amazon.com/dp/B0BQXTHTXY  
9798371090133 | 9798371093240

@ResearchGate: researchgate.net/publication/36...  
@Scribd: scribd.com/document/61702...  
@Academia: academia.edu/93605376/Super...  
@Zenodo: zenodo.org/record/7480110  
@Wordpress:

drhenrygarrett.wordpress.com  
SuperHyperGraphs (Published Version)  
Hardcover: ASIN : B0BQXTHTXY | Hardcover : 117 pages | ISBN-13 : 979-8371093240 | Paperback: ASIN : B0BR1NH4Z | Paperback : ...

8:22 AM · Jan 3, 2023 from Manhattan, NY

Figure 43.28: “SuperHyperGraph-Based Books”: | Featured Tweets #61



**Dr. Henry Garrett**  
@DrHenryGarrett · Follow

Book #60  
Neut. SuperHyperEdges

[scribd.com/document/61115...](https://scribd.com/document/61115...)

[zenodo.org/record/7378758](https://zenodo.org/record/7378758)

[academia.edu/91877217/Neut\\_...](https://academia.edu/91877217/Neut_...)

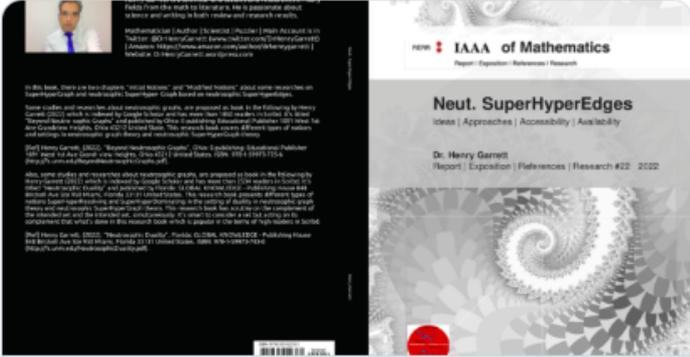
[researchgate.net/publication/36...](https://researchgate.net/publication/36...)

—

Publisher: (Paperback): [amazon.com/dp/BOBNH11ZDY](https://amazon.com/dp/BOBNH11ZDY) |  
(Hardcover): [amazon.com/dp/BOBNGZGPP6](https://amazon.com/dp/BOBNGZGPP6)

9798365922365 | 9798365923980

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drhenrygarrett.wordpress.com  
Neut. SuperHyperEdges (Published Version)  
Hardcover: Paperback: 0050-neut.-superhyperedges-18Download  
Book #60Neut. SuperHyperEdges @Wordpress: @Scribd: @Zenodo: ...

8:22 AM · Jan 3, 2023 from Manhattan, NY

Figure 43.29: “SuperHyperGraph-Based Books”: | Featured Tweets #60



CHAPTER 44

5978

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**CV**

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5979

# Henry Garrett | CV

- » **Status:** Known As Henry Garrett With Highly Productive Style.
- » **Fields:** Combinatorics, Algebraic Structures, Algebraic Hyperstructures, Fuzzy Logic
- » **Prefers:** Graph Theory, Domination, Metric Dimension, Neutrosophic Graph Theory, Neutrosophic Domination, Lattice Theory, Groups and Hypergroups
- » **Activities:** Traveling, Painting, Writing, Reading books and Papers



## »»» Professional Experiences

- |                |   |     |
|----------------|---|-----|
| 2017 - Present | Continuous Member   | AMS |
|                | <ul style="list-style-type: none"> <li>» I tried to show them that Science is not only interesting, it's beautiful and exciting.</li> <li>» Participating in the academic space of the largest mathematical Society gave me valuable experiences. The use of Bulletin and Notice of the American Mathematical Society is another benefit of this presence.</li> </ul> |     |
| 2017 - 2019    | Continuous Member   | EMS |
|                | <ul style="list-style-type: none"> <li>» The use Newsletter of the European Mathematical Society is benefit of this membership.</li> <li>» I am interested in giving a small, though small, effect on math epidemic progress</li> </ul>   |     |

## »»» Awards and Achievements

- |              |  |  |
|--------------|--|--|
| Sep 2022     | Award: Selected as an Editorial Board Member to JMTCM  | JMTCM  |
|              | <ul style="list-style-type: none"> <li>» Award: Selected as an Editorial Board Member to Journal of Mathematical Techniques and Computational Mathematics(JMTCM)</li> <li>» Journal of Mathematical Techniques and Computational Mathematics(JMTCM)</li> </ul> |  |
| Jun 2022     | Award: Selected as an Editorial Board Member to JCTCSR   | JCTCSR   |
|              | <ul style="list-style-type: none"> <li>» Award: Selected as an Editorial Board Member to Journal of Current Trends in Computer Science Research(JCTCSR)</li> <li>» Journal of Current Trends in Computer Science Research(JCTCSR)</li> </ul>                   |  |
| Jan 23, 2022 | Award: Diploma By Neutrosophic Science International Association   | Neutrosophic Science International Association |
|              | <ul style="list-style-type: none"> <li>» Award: Distinguished Achievements</li> <li>» Honorary Memebrship</li> </ul>   |  |

## »»» Journal Referee

- |          |  |        |
|----------|--|--------|
| Sep 2022 | Editorial Board Member to JMTCM  | JMTCM  |
|          | <ul style="list-style-type: none"> <li>» Editorial Board Member to Journal of Mathematical Techniques and Computational Mathematics(JMTCM)</li> <li>» Journal of Mathematical Techniques and Computational Mathematics(JMTCM)</li> </ul> |        |
| Jun 2022 | Editorial Board Member to JCTCSR   | JCTCSR |
|          | <ul style="list-style-type: none"> <li>» Editorial Board Member to Journal of Current Trends in Computer Science Research(JCTCSR)</li> <li>» Journal of Current Trends in Computer Science Research(JCTCSR)</li> </ul>                   |        |

 Publications: Articles

2023	0126   Extreme SuperHyperClique as the Firm Scheme of Confrontation under Cancer's Recognition as the Model in The Setting of (Neutrosophic) SuperHyperGraphs	Manuscript
	<ul style="list-style-type: none"> <li>» Henry Garrett, "Extreme SuperHyperClique as the Firm Scheme of Confrontation under Cancer's Recognition as the Model in The Setting of (Neutrosophic) SuperHyperGraphs", Preprints 2023, 2023010308 (doi: 10.20944/preprints202301.0308.v1).</li> <li>» Available at Twitter, ResearchGate, Scribd, Academia, Zenodo, LinkedIn</li> </ul>	
2023	0125   Uncertainty On The Act And Effect Of Cancer Alongside The Foggy Positions Of Cells Toward Neutrosophic Failed SuperHyperClique inside Neutrosophic SuperHyperGraphs Titled Cancer's Recognition	Manuscript
	<ul style="list-style-type: none"> <li>» Henry Garrett, "Uncertainty On The Act And Effect Of Cancer Alongside The Foggy Positions Of Cells Toward Neutrosophic Failed SuperHyperClique inside Neutrosophic SuperHyperGraphs Titled Cancer's Recognition", Preprints 2023, 2023010282 (doi: 10.20944/preprints202301.0282.v1).</li> <li>» Available at Twitter, ResearchGate, Scribd, Academia, Zenodo, LinkedIn</li> </ul>	
2023	0124   Neutrosophic Version Of Separates Groups Of Cells In Cancer's Recognition On Neutrosophic SuperHyperGraphs	Manuscript
	<ul style="list-style-type: none"> <li>» Henry Garrett, "Neutrosophic Version Of Separates Groups Of Cells In Cancer's Recognition On Neutrosophic SuperHyperGraphs", Preprints 2023, 2023010267 (doi: 10.20944/preprints202301.0267.v1).</li> <li>» Available at Twitter, ResearchGate, Scribd, Academia, Zenodo, LinkedIn</li> </ul>	
2023	0123   The Shift Paradigm To Classify Separately The Cells and Affected Cells Toward The Totality Under Cancer's Recognition By New Multiple Definitions On the Sets Polynomials Alongside Numbers In The (Neutrosophic) SuperHyperMatching Theory Based on SuperHyperGraph and Neutrosophic SuperHyperGraph	Manuscript
	<ul style="list-style-type: none"> <li>» Henry Garrett, "The Shift Paradigm To Classify Separately The Cells and Affected Cells Toward The Totality Under Cancer's Recognition By New Multiple Definitions On the Sets Polynomials Alongside Numbers In The (Neutrosophic) SuperHyperMatching Theory Based on SuperHyperGraph and Neutrosophic SuperHyperGraph", Preprints 2023, 2023010265 (doi: 10.20944/preprints202301.0265.v1).</li> <li>» Available at Twitter, ResearchGate, Scribd, Academia, Zenodo, LinkedIn</li> </ul>	
2023	0122   Breaking the Continuity and Uniformity of Cancer In The Worst Case of Full Connections With Extreme Failed SuperHyperClique In Cancer's Recognition Applied in (Neutrosophic) SuperHyperGraphs	Manuscript
	<ul style="list-style-type: none"> <li>» Henry Garrett, "Breaking the Continuity and Uniformity of Cancer In The Worst Case of Full Connections With Extreme Failed SuperHyperClique In Cancer's Recognition Applied in (Neutrosophic) SuperHyperGraphs", Preprints 2023, 2023010262, (doi: 10.20944/preprints202301.0262.v1).</li> <li>» Available at Twitter, ResearchGate, Scribd, Academia, Zenodo, LinkedIn</li> </ul>	
2023	0121   Neutrosophic Failed SuperHyperStable as the Survivors on the Cancer's Neutrosophic Recognition Based on Uncertainty to All Modes in Neutrosophic SuperHyperGraphs	Manuscript
	<ul style="list-style-type: none"> <li>» Henry Garrett, "Neutrosophic Failed SuperHyperStable as the Survivors on the Cancer's Neutrosophic Recognition Based on Uncertainty to All Modes in Neutrosophic SuperHyperGraphs", Preprints 2023, 2023010240 (doi: 10.20944/preprints202301.0240.v1).</li> <li>» Available at Twitter, ResearchGate, Scribd, Academia, Zenodo, LinkedIn</li> </ul>	
2023	0120   Extremism of the Attacked Body Under the Cancer's Circumstances Where Cancer's Recognition Titled (Neutrosophic) SuperHyperGraphs	Manuscript
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2022	0068	Relations and Notions amid Hamiltonicity and Eulerian Notions in Some Classes of Neutrosophic Graphs	Manuscript

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- 2021      0018 | Metric Dimensions Of Graphs Manuscript
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- 2018      0010 | A Study on Domination in two Fuzzy Models Manuscript
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- 2019      0008 | Nikfar Dominations: Definitions, Theorems, and Connections Manuscript
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- 2019      0007 | Nikfar Domination in Fuzzy Graphs      [Manuscript](#)
- » M. Nikfar, “Nikfar Domination in Fuzzy Graphs”, Preprints 2019, 2019010024 (doi: 10.20944/preprints201901.0024.v2).
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 Publications: Books

2023	0069   SuperHyperMatching	<a href="#">Amazon</a>
	<p>» ASIN : B0BDPXX1P Publisher : Independently published (January 15, 2023) Language : English Paperback : 582 pages ISBN-13 : 979-8373872683 Item Weight : 3.6 pounds Dimensions : 8.5 x 1.37 x 11 inches</p> <p>» ASIN : B0BSDC1L66 Publisher : Independently published (January 16, 2023) Language : English Hardcover : 548 pages ISBN-13 : 979-8373875424 Item Weight : 3.3 pounds Dimensions : 8.25 x 1.48 x 11 inches</p>	
2023	0068   Failed SuperHyperClique	<a href="#">Amazon</a>
	<p>» ASIN : B0BRZ67NYN Publisher : Independently published (January 10, 2023) Language : English Paperback : 454 pages ISBN-13 : 979-8373274227 Item Weight : 2.83 pounds Dimensions : 8.5 x 1.07 x 11 inches</p> <p>» ASIN : B0BRYZTK24 Publisher : Independently published (January 10, 2023) Language : English Hardcover : 460 pages ISBN-13 : 979-8373277273 Item Weight : 2.78 pounds Dimensions : 8.25 x 1.27 x 11 inches</p>	
2023	0067   SuperHyperClique	<a href="#">Amazon</a>
	<p>» ASIN : B0BRWK4S1Y Publisher : Independently published (January 8, 2023) Language : English Paperback : 376 pages ISBN-13 : 979-8373040471 Item Weight : 2.36 pounds Dimensions : 8.5 x 0.89 x 11 inches</p> <p>» ASIN : B0BRM24YJX Publisher : Independently published (January 8, 2023) Language : English Hardcover : 388 pages ISBN-13 : 979-8373041935 Item Weight : 2.36 pounds Dimensions : 8.25 x 1.1 x 11 inches</p>	
2023	0066   Failed SuperHyperStable	<a href="#">Amazon</a>
	<p>» ASIN : B0BRNG7DC8 Publisher : Independently published (January 4, 2023) Language : English Paperback : 304 pages ISBN-13 : 979-8372597976 Item Weight : 1.93 pounds Dimensions : 8.5 x 0.72 x 11 inches</p> <p>» ASIN : B0BRLVN39L Publisher : Independently published (January 4, 2023) Language : English Hardcover : 306 pages ISBN-13 : 979-8372599765 Item Weight : 1.89 pounds Dimensions : 8.25 x 0.91 x 11 inches</p>	
2023	0065   SuperHyperStable	<a href="#">Amazon</a>
	<p>» ASIN : B0BRDG5Z4Y Publisher : Independently published (January 2, 2023) Language : English Paperback : 294 pages ISBN-13 : 979-8372248519 Item Weight : 1.93 pounds Dimensions : 8.27 x 0.7 x 11.69 inches</p> <p>» ASIN : B0BRJPG56M Publisher : Independently published (January 2, 2023) Language : English Hardcover : 290 pages ISBN-13 : 979-8372252011 Item Weight : 1.79 pounds Dimensions : 8.25 x 0.87 x 11 inches</p>	
2023	0064   Failed SuperHyperForcing	<a href="#">Amazon</a>
	<p>» ASIN : B0BRH5B4QM Publisher : Independently published (January 1, 2023) Language : English Paperback : 337 pages ISBN-13 : 979-8372123649 Item Weight : 2.13 pounds Dimensions : 8.5 x 0.8 x 11 inches</p> <p>» ASIN : B0BRGX4DBJ Publisher : Independently published (January 1, 2023) Language : English Hardcover : 337 pages ISBN-13 : 979-8372124509 Item Weight : 2.07 pounds Dimensions : 8.25 x 0.98 x 11 inches</p>	
2022	0063   SuperHyperForcing	<a href="#">Amazon</a>
	<p>» ASIN : B0BRDG1KN1 Publisher : Independently published (December 30, 2022) Language : English Paperback : 285 pages ISBN-13 : 979-8371873347 Item Weight : 1.82 pounds Dimensions : 8.5 x 0.67 x 11 inches</p> <p>» ASIN : B0BRDFFQMF Publisher : Independently published (December 30, 2022) Language : English Hardcover : 285 pages ISBN-13 : 979-8371874092 Item Weight : 1.77 pounds Dimensions : 8.25 x 0.86 x 11 inches</p>	

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2022	0062   SuperHyperAlliances	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BR6YC3HG Publisher : Independently published (December 27, 2022) Language : English Paperback : 189 pages ISBN-13 : 979-8371488343 Item Weight : 1.24 pounds Dimensions : 8.5 x 0.45 x 11 inches</li> <li>» ASIN : B0BR7CBTC6 Publisher : Independently published (December 27, 2022) Language : English Hardcover : 189 pages ISBN-13 : 979-8371494849 Item Weight : 1.21 pounds Dimensions : 8.25 x 0.64 x 11 inches</li> </ul>	
2022	0061   SuperHyperGraphs	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BR1NHYZ Publisher : Independently published (December 24, 2022) Language : English Paperback : 117 pages ISBN-13 : 979-8371090133 Item Weight : 13 ounces Dimensions : 8.5 x 0.28 x 11 inches</li> <li>» ASIN : B0BQXTHTXY Publisher : Independently published (December 24, 2022) Language : English Hardcover : 117 pages ISBN-13 : 979-8371093240 Item Weight : 12.6 ounces Dimensions : 8.25 x 0.47 x 11 inches</li> </ul>	
2022	0060   Neut. SuperHyperEdges	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BNH11ZDY Publisher : Independently published (November 27, 2022) Language : English Paperback : 107 pages ISBN-13 : 979-8365922365 Item Weight : 12 ounces Dimensions : 8.5 x 0.26 x 11 inches</li> <li>» ASIN : B0BNGZGPP6 Publisher : Independently published (November 27, 2022) Language : English Hardcover : 107 pages ISBN-13 : 979-8365923980 Item Weight : 11.7 ounces Dimensions : 8.25 x 0.45 x 11 inches</li> </ul>	
2022	0059   Neutrosophic k-Number	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BF3P5X4N Publisher : Independently published (September 14, 2022) Language : English Paperback : 159 pages ISBN-13 : 979-8352590843 Item Weight : 1.06 pounds Dimensions : 8.5 x 0.38 x 11 inches</li> <li>» ASIN : B0BF2XCDZM Publisher : Independently published (September 14, 2022) Language : English Hardcover : 159 pages ISBN-13 : 979-8352593394 Item Weight : 1.04 pounds Dimensions : 8.25 x 0.57 x 11 inches</li> </ul>	
2022	0058   Neutrosophic Schedule	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BBJWJZJF Publisher : Independently published (August 22, 2022) Language : English Paperback : 493 pages ISBN-13 : 979-8847885256 Item Weight : 3.07 pounds Dimensions : 8.5 x 1.16 x 11 inches</li> <li>» ASIN : B0BBJLPWKH Publisher : Independently published (August 22, 2022) Language : English Hardcover : 493 pages ISBN-13 : 979-8847886055 Item Weight : 2.98 pounds Dimensions : 8.25 x 1.35 x 11 inches</li> </ul>	
2022	0057   Neutrosophic Wheel	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BBJRHXG Publisher : Independently published (August 22, 2022) Language : English Paperback : 195 pages ISBN-13 : 979-8847865944 Item Weight : 1.28 pounds Dimensions : 8.5 x 0.46 x 11 inches</li> <li>» ASIN : B0BBK3KG82 Publisher : Independently published (August 22, 2022) Language : English Hardcover : 195 pages ISBN-13 : 979-8847867016 Item Weight : 1.25 pounds Dimensions : 8.25 x 0.65 x 11 inches</li> </ul>	
2022	0056   Neutrosophic t-partite	<a href="#">Amazon</a>
	<ul style="list-style-type: none"> <li>» ASIN : B0BBJLZCHS Publisher : Independently published (August 22, 2022) Language : English Paperback : 235 pages ISBN-13 : 979-8847834957 Item Weight : 1.52 pounds Dimensions : 8.5 x 0.56 x 11 inches</li> <li>» ASIN : B0BBJDFGJS Publisher : Independently published (August 22, 2022) Language : English Hardcover : 235 pages ISBN-13 : 979-8847838337 Item Weight : 1.48 pounds Dimensions : 8.25 x 0.75 x 11 inches</li> </ul>	
2022	0055   Neutrosophic Bipartite	<a href="#">Amazon</a>

	<p>» ASIN : B0BB5Z9GHW Publisher : Independently published (August 22, 2022) Language : English Paperback : 225 pages ISBN-13 : 979-8847820660 Item Weight : 1.46 pounds Dimensions : 8.5 x 0.53 x 11 inches</p> <p>» ASIN : B0BBGG9RDZ Publisher : Independently published (August 22, 2022) Language : English Hardcover : 225 pages ISBN-13 : 979-8847821667 Item Weight : 1.42 pounds Dimensions : 8.25 x 0.72 x 11 inches</p>	
2022	0054   Neutrosophic Star	<a href="#">Amazon</a>
	<p>» ASIN : B0BB5ZHSSZ Publisher : Independently published (August 22, 2022) Language : English Paperback : 215 pages ISBN-13 : 979-8847794374 Item Weight : 1.4 pounds Dimensions : 8.5 x 0.51 x 11 inches</p> <p>» ASIN : B0BBC4BL9P Publisher : Independently published (August 22, 2022) Language : English Hardcover : 215 pages ISBN-13 : 979-8847796941 Item Weight : 1.36 pounds Dimensions : 8.25 x 0.7 x 11 inches</p>	
2022	0053   Neutrosophic Cycle	<a href="#">Amazon</a>
	<p>» ASIN : B0BB62NZQK Publisher : Independently published (August 22, 2022) Language : English Paperback : 343 pages ISBN-13 : 979-8847780834 Item Weight : 2.17 pounds Dimensions : 8.5 x 0.81 x 11 inches</p> <p>» ASIN : B0BB65QMKQ Publisher : Independently published (August 22, 2022) Language : English Hardcover : 343 pages ISBN-13 : 979-8847782715 Item Weight : 2.11 pounds Dimensions : 8.25 x 1 x 11 inches</p>	
2022	0052   Neutrosophic Path	<a href="#">Amazon</a>
	<p>» ASIN : B0BB67WCXL Publisher : Independently published (August 8, 2022) Language : English Paperback : 315 pages ISBN-13 : 979-8847730570 Item Weight : 2 pounds Dimensions : 8.5 x 0.74 x 11 inches</p> <p>» ASIN : B0BB5Z9FXL Publisher : Independently published (August 8, 2022) Language : English Hardcover : 315 pages ISBN-13 : 979-8847731263 Item Weight : 1.95 pounds Dimensions : 8.25 x 0.93 x 11 inches</p>	
2022	0051   Neutrosophic Complete	<a href="#">Amazon</a>
	<p>» ASIN : B0BB6191KN Publisher : Independently published (August 8, 2022) Language : English Paperback : 227 pages ISBN-13 : 979-8847720878 Item Weight : 1.47 pounds Dimensions : 8.5 x 0.54 x 11 inches</p> <p>» ASIN : B0BB5RRQN7 Publisher : Independently published (August 8, 2022) Language : English Hardcover : 227 pages ISBN-13 : 979-8847721844 Item Weight : 1.43 pounds Dimensions : 8.25 x 0.73 x 11 inches</p>	
2022	0050   Neutrosophic Dominating	<a href="#">Amazon</a>
	<p>» ASIN : B0BB5QV8WT Publisher : Independently published (August 8, 2022) Language : English Paperback : 357 pages ISBN-13 : 979-8847592000 Item Weight : 2.25 pounds Dimensions : 8.5 x 0.84 x 11 inches</p> <p>» ASIN : B0BB61WL9M Publisher : Independently published (August 8, 2022) Language : English Hardcover : 357 pages ISBN-13 : 979-8847593755 Item Weight : 2.19 pounds Dimensions : 8.25 x 1.03 x 11 inches</p>	
2022	0049   Neutrosophic Resolving	<a href="#">Amazon</a>
	<p>» ASIN : B0BBCJMRH8 Publisher : Independently published (August 8, 2022) Language : English Paperback : 367 pages ISBN-13 : 979-8847587891 Item Weight : 2.31 pounds Dimensions : 8.5 x 0.87 x 11 inches</p> <p>» ASIN : B0BBCB6DFC Publisher : Independently published (August 8, 2022) Language : English Hardcover : 367 pages ISBN-13 : 979-8847589987 Item Weight : 2.25 pounds Dimensions : 8.25 x 1.06 x 11 inches</p>	
2022	0048   Neutrosophic Stable	<a href="#">Amazon</a>

		<p>» ASIN : B0B7QGTNFW Publisher : Independently published (July 28, 2022) Language : English Paperback : 133 pages ISBN-13 : 979-8842880348 Item Weight : 14.6 ounces Dimensions : 8.5 x 0.32 x 11 inches</p> <p>» ASIN : B0B7QJWQ35 Publisher : Independently published (July 28, 2022) Language : English Hardcover : 133 pages ISBN-13 : 979-8842881659 Item Weight : 14.2 ounces Dimensions : 8.25 x 0.51 x 11 inches</p>	
2022		0047   Neutrosophic Total	<a href="#">Amazon</a>
		<p>» ASIN : B0B7GLB23F Publisher : Independently published (July 25, 2022) Language : English Paperback : 137 pages ISBN-13 : 979-8842357741 Item Weight : 14.9 ounces Dimensions : 8.5 x 0.33 x 11 inches</p> <p>» ASIN : B0B6XVTDYC Publisher : Independently published (July 25, 2022) Language : English Hardcover : 137 pages ISBN-13 : 979-8842358915 Item Weight : 14.6 ounces Dimensions : 8.25 x 0.52 x 11 inches</p>	
2022		0046   Neutrosophic Perfect	<a href="#">Amazon</a>
		<p>» ASIN : B0B7CJHCYZ Publisher : Independently published (July 22, 2022) Language : English Paperback : 127 pages ISBN-13 : 979-8842027330 Item Weight : 13.9 ounces Dimensions : 8.5 x 0.3 x 11 inches</p> <p>» ASIN : B0B7C732Z1 Publisher : Independently published (July 22, 2022) Language : English Hardcover : 127 pages ISBN-13 : 979-8842028757 Item Weight : 13.6 ounces Dimensions : 8.25 x 0.49 x 11 inches</p>	
2022		0045   Neutrosophic Joint Set	<a href="#">Amazon</a>
		<p>» ASIN : B0B6L8WJ77 Publisher : Independently published (July 15, 2022) Language : English Paperback : 139 pages ISBN-13 : 979-8840802199 Item Weight : 15 ounces Dimensions : 8.5 x 0.33 x 11 inches</p> <p>» ASIN : B0B6L9GJWR Publisher : Independently published (July 15, 2022) Language : English Hardcover : 139 pages ISBN-13 : 979-8840803295 Item Weight : 14.7 ounces Dimensions : 8.25 x 0.52 x 11 inches</p>	
August 2022	30,	0044   Neutrosophic Duality	<a href="#">GLOBAL KNOWLEDGE - Publishing House&amp;Amazon&amp;Google Scholar&amp;UNM</a>
		<p>» Neutrosophic Duality, GLOBAL KNOWLEDGE - Publishing House: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. ISBN: 978-1-59973-743-0 Henry Garrett, (2022). "Neutrosophic Duality", Florida: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. ISBN: 978-1-59973-743-0 (<a href="http://fs.unm.edu/NeutrosophicDuality.pdf">http://fs.unm.edu/NeutrosophicDuality.pdf</a>).</p> <p>» ASIN : B0B4SJ8Y44 Publisher : Independently published (June 22, 2022) Language : English Paperback : 115 pages ISBN-13 : 979-8837647598 Item Weight : 12.8 ounces Dimensions : 8.5 x 0.27 x 11 inches</p> <p>ASIN : B0B46B4CXT Publisher : Independently published (June 22, 2022) Language : English Hardcover : 115 pages ISBN-13 : 979-8837649981 Item Weight : 12.5 ounces Dimensions : 8.25 x 0.46 x 11 inches</p> <p>GLOBAL KNOWLEDGE - Publishing House: <a href="http://fs.unm.edu/NeutrosophicDuality.pdf">http://fs.unm.edu/NeutrosophicDuality.pdf</a> UNM: <a href="http://fs.unm.edu/NeutrosophicDuality.pdf">http://fs.unm.edu/NeutrosophicDuality.pdf</a> Google Scholar: <a href="https://books.google.com/books?id=dWWkEAAAQBAJ">https://books.google.com/books?id=dWWkEAAAQBAJ</a> Paperback: <a href="https://www.amazon.com/dp/B0B4SJ8Y44">https://www.amazon.com/dp/B0B4SJ8Y44</a> Hardcover: <a href="https://www.amazon.com/dp/B0B46B4CXT">https://www.amazon.com/dp/B0B46B4CXT</a></p>	
2022		0043   Neutrosophic Path-Coloring	<a href="#">Amazon</a>

	<p>» ASIN : B0B3F2BZC4 Publisher : Independently published (June 7, 2022) Language : English Paperback : 161 pages ISBN-13 : 979-8834894469 Item Weight : 1.08 pounds Dimensions : 8.5 x 0.38 x 11 inches</p> <p>» ASIN : B0B3FGPGQ3 Publisher : Independently published (June 7, 2022) Language : English Hardcover : 161 pages ISBN-13 : 979-8834895954 Item Weight : 1.05 pounds Dimensions : 8.25 x 0.57 x 11 inches</p>	
2022	0042   Neutrosophic Density	<a href="#">Amazon</a>
	<p>» ASIN : B0B19CDX7W Publisher : Independently published (May 15, 2022) Language : English Paperback : 145 pages ISBN-13 : 979-8827498285 Item Weight : 15.7 ounces Dimensions : 8.5 x 0.35 x 11 inches</p> <p>» ASIN : B0B14PLPGL Publisher : Independently published (May 15, 2022) Language : English Hardcover : 145 pages ISBN-13 : 979-8827502944 Item Weight : 15.4 ounces Dimensions : 8.25 x 0.53 x 11 inches</p>	
2022	0041   Properties of SuperHyperGraph and Neutrosophic SuperHyperGraph	<a href="#">Google Commerce Ltd</a>
	<p>» Publisher Infinite Study Seller Google Commerce Ltd Published on Apr 27, 2022 Pages 30 Features Original pages Best for web, tablet, phone, eReader Language English Genres Antiques &amp; Collectibles / Reference Content protection This content is DRM free GooglePlay</p> <p>» Properties of SuperHyperGraph and Neutrosophic SuperHyperGraph Front Cover Henry Garrett Infinite Study, 27 Apr 2022 - Antiques &amp; Collectibles - 30 pages GoogleBooks Henry Garrett, "Properties of SuperHyperGraph and Neutrosophic SuperHyperGraph", Neutrosophic Sets and Systems 49 (2022) 531-561 (doi: 893 10.5281/zenodo.6456413). (<a href="http://fs.unm.edu/NSS/NeutrosophicSuperHyperGraph34.pdf">http://fs.unm.edu/NSS/NeutrosophicSuperHyperGraph34.pdf</a>).</p>	
2022	0040   Neutrosophic Connectivity	<a href="#">Amazon</a>
	<p>» ASIN : B09YQJG2ZV Publisher : Independently published (April 26, 2022) Language : English Paperback : 121 pages ISBN-13 : 979-8811310968 Item Weight : 13.4 ounces Dimensions : 8.5 x 0.29 x 11 inches</p> <p>» ASIN : B09YQJG2DZ Publisher : Independently published (April 26, 2022) Language : English Hardcover : 121 pages ISBN-13 : 979-8811316304 Item Weight : 13.1 ounces Dimensions : 8.25 x 0.48 x 11 inches</p>	
2022	0039   Neutrosophic Cycles	<a href="#">Amazon</a>
	<p>» ASIN : B09X4KVLQG Publisher : Independently published (April 8, 2022) Language : English Paperback : 169 pages ISBN-13 : 979-8449137098 Item Weight : 1.12 pounds Dimensions : 8.5 x 0.4 x 11 inches</p> <p>» ASIN : B09X4LZ3HL Publisher : Independently published (April 8, 2022) Language : English Hardcover : 169 pages ISBN-13 : 979-8449144157 Item Weight : 1.09 pounds Dimensions : 8.25 x 0.59 x 11 inches</p>	
2022	0038   Girth in Neutrosophic Graphs	<a href="#">Amazon</a>
	<p>» ASIN : B09WQ5PFV8 Publisher : Independently published (March 29, 2022) Language : English Paperback : 163 pages ISBN-13 : 979-8442380538 Item Weight : 1.09 pounds Dimensions : 8.5 x 0.39 x 11 inches</p> <p>» ASIN : B09WQQGXPZ Publisher : Independently published (March 29, 2022) Language : English Hardcover : 163 pages ISBN-13 : 979-8442386592 Item Weight : 1.06 pounds Dimensions : 8.25 x 0.58 x 11 inches</p>	
2022	0037   Matching Number in Neutrosophic Graphs	<a href="#">Amazon</a>
	<p>» ASIN : B09W7FT8GM Publisher : Independently published (March 22, 2022) Language : English Paperback : 153 pages ISBN-13 : 979-8437529676 Item Weight : 1.03 pounds Dimensions : 8.5 x 0.36 x 11 inches</p> <p>» ASIN : B09W4HF99L Publisher : Independently published (March 22, 2022) Language : English Hardcover : 153 pages ISBN-13 : 979-8437539057 Item Weight : 1 pounds Dimensions : 8.25 x 0.55 x 11 inches</p>	

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» ASIN : B09TZBPWJG Publisher : Independently published (March 7, 2022) Language : English Hardcover : 155 pages ISBN-13 : 979-8428590258 Item Weight : 1.01 pounds Dimensions : 8.25 x 0.56 x 11 inches

2022 0035 | Independence in Neutrosophic Graphs [Amazon](#)

» ASIN : B09TF227GG Publisher : Independently published (February 27, 2022) Language : English Paperback : 149 pages ISBN-13 : 979-8424231681 Item Weight : 1 pounds Dimensions : 8.5 x 0.35 x 11 inches

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» ASIN : B0BBCQJQG5 Publisher : Independently published (August 8, 2022) Language : English Paperback : 257 pages ISBN-13 : 979-8847564885 Item Weight : 1.65 pounds Dimensions : 8.5 x 0.61 x 11 inches

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» ASIN : B09R39MTSW Publisher : Independently published (January 26, 2022) Language : English Hardcover : 87 pages ISBN-13 : 979-8408632459 Item Weight : 9.9 ounces Dimensions : 8.25 x 0.4 x 11 inches

2022	0030   Neutrosophic Hypergraphs	<a href="#">Amazon</a>
	» ASIN : B09PMBKVD4 Publisher : Independently published (January 7, 2022) Language : English Paperback : 79 pages ISBN-13 : 979-8797327974 Item Weight : 9.3 ounces Dimensions : 8.5 x 0.19 x 11 inches	
	» ASIN : B09PP8VZ3D Publisher : Independently published (January 7, 2022) Language : English Hardcover : 79 pages ISBN-13 : 979-8797331483 Item Weight : 9.1 ounces Dimensions : 8.25 x 0.38 x 11 inches	
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2022	0028   Collections of Math	<a href="#">Amazon</a>
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	» ASIN : B09PHBWT5D Publisher : Independently published (January 1, 2022) Language : English Hardcover : 461 pages ISBN-13 : 979-8793793339 Item Weight : 2.8 pounds Dimensions : 8.25 x 1.28 x 11 inches	
2022	0027   Collections of US	<a href="#">Amazon</a>
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	» ASIN : B09PHBT924 Publisher : Independently published (December 31, 2021) Language : English Hardcover : 261 pages ISBN-13 : 979-8793629645 Item Weight : 1.63 pounds Dimensions : 8.25 x 0.81 x 11 inches	
2021	0026   Neutrosophic Chromatic Number	<a href="#">Amazon</a>
	» ASIN : B09NRD25MG Publisher : Independently published (December 20, 2021) Language : English Paperback : 67 pages ISBN-13 : 979-8787858174 Item Weight : 8.2 ounces Dimensions : 8.5 x 0.16 x 11 inches Language : English	
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2021	0024   Neutrosophic Graphs	<a href="#">Amazon</a>
	» ASIN : B09MYXVNF9 Publisher : Independently published (December 7, 2021) Language : English Paperback : 55 pages ISBN-13 : 979-8780775652 Item Weight : 7 ounces Dimensions : 8.5 x 0.13 x 11 inches	
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2021	0023   List	<a href="#">Amazon</a>
	» ASIN : B09M554XCL Publisher : Independently published (November 20, 2021) Language : English Paperback : 49 pages ISBN-13 : 979-8770762747 Item Weight : 6.4 ounces Dimensions : 8.5 x 0.12 x 11 inches	
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2021	0022   Theorems	<a href="#">Amazon</a>
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2021	0019   Located Heart And Memories	<a href="#">Amazon</a>
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2021	0017   First Place Is Reserved	<a href="#">Amazon</a>
	<p>» ASIN : B098CWD5PT Publisher : Independently published (June 30, 2021) Language : English Paperback : 55 pages ISBN-13 : 979-8529508497 Item Weight : 7 ounces Dimensions : 8.5 x 0.13 x 11 inches</p> <p>» -</p>	
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2021	0014   Words And Their Directionss	<a href="#">Amazon</a>
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	<p>» ASIN : B098DMMZ87 Publisher : Independently published (June 30, 2021) Language : English Paperback : 188 pages ISBN-13 : 979-8728100775 Item Weight : 1.23 pounds Dimensions : 8.5 x 0.45 x 11 inches</p> <p>» -</p>	
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	<p>» ASIN : B08PVNJYRM Publication date : December 6, 2020 Language : English File size : 1544 KB Simultaneous device usage : Unlimited Text-to-Speech : Enabled Screen Reader : Supported Enhanced typesetting : Enabled X-Ray : Not Enabled Word Wise : Enabled Print length : 24 pages Lending : Enabled Kindle</p> <p>» -</p>	
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0004 | Analisi dei modelli e guida oltre

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### ▶▶▶ Participating in Seminars

I've participated in all virtual conferences which are listed below [Some of them without selective process].

-<https://web.math.princeton.edu/pds/onlinetalks/talks.html>

...

Also, I've participated in following events [Some of them without selective process]:

-The Hidden NORMS seminar

-Talk Math With Your Friends (TMWYF)

-MATHEMATICS COLLOQUIUM: <https://www.csulb.edu/mathematics-statistics/mathematics-colloquium>

-Lathisms: Cafe Con Leche

-Big Math network

...

I'm in mailing list in following [Some of them without selective process] organizations:

-[Algebraic-graph-theory] AGT Seminar ([lists-uwaterloo-ca](mailto:lists-uwaterloo-ca))

-Combinatorics Lectures Online (<https://web.math.princeton.edu/pds/onlinetalks/talks.html>)

-Women in Combinatorics

-CMSA-Seminar ([unsw-au](mailto:unsw-au))

-OURFA2M2 Online Undergraduate Resource Fair for the Advancement and Alliance of Marginalized Mathematicians

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### »»» Social Accounts

I've listed my accounts below.

-My website [Covering all my contributions containing articles and books as free access to download with PDF extension and more]: <https://drhenrygarrett.wordpress.com>

-Amazon [Some of my all books, here]: <https://www.amzn.com/author/drhenrygarrett>

-Twitter: @DrHenryGarrett ([www.twitter.com/DrHenryGarrett](http://www.twitter.com/DrHenryGarrett))

- ResearchGate: <https://www.researchgate.net/profile/Henry-Garrett-2>

-Academia: <https://independent.academia.edu/drhenrygarrett/>

-Scribd: <https://www.scribd.com/user/596815491/Henry-Garrett>

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6013

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In this scientific research book, there are some scientific research chapters on "Extreme  $\lambda$ -SuperHyperGraphs" and "Neutrosophic  $\lambda$ -SuperHyperGraphs" about some scientific researches on  $\lambda$ -SuperHyperGraphs by two (Extreme/Neutrosophic) notions, namely, Extreme  $\lambda$ -SuperHyperGraphs and Neutrosophic  $\lambda$ -SuperHyperGraphs. With scientific researches on the basic properties, the scientific research book starts to make Extreme  $\lambda$ -SuperHyperGraphs theory and Neutrosophic  $\lambda$ -SuperHyperGraphs theory more (Extremely/Neutrosophically) understandable.

Some scientific studies and scientific researches about neutrosophic graphs, are proposed as book in the following by Henry Garrett (2022) which is indexed by Google Scholar and has more than 3230 readers in Scribd. It's titled "Beyond Neutrosophic Graphs" and published by Ohio: E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United State. This research book covers different types of notions and settings in neutrosophic graph theory and neutrosophic SuperHyperGraph theory.

[Ref] Henry Garrett, (2022). "Beyond Neutrosophic Graphs", Ohio: E-publishing: Educational Publisher 1091 West 1st Ave Grandview Heights, Ohio 43212 United States. ISBN: 978-1-59973-725-6 (<http://fs.unm.edu/BeyondNeutrosophicGraphs.pdf>).

Also, some scientific studies and scientific researches about neutrosophic graphs, are proposed as book in the following by Henry Garrett (2022) which is indexed by Google Scholar and has more than 4117 readers in Scribd. It's titled "Neutrosophic Duality" and published by Florida: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. This research book presents different types of notions SuperHyperResolving and SuperHyperDominating in the setting of duality in neutrosophic graph theory and neutrosophic SuperHyperGraph theory. This research book has scrutiny on the complement of the intended set and the intended set, simultaneously. It's smart to consider a set but acting on its complement that what's done in this research book which is popular in the terms of high readers in Scribd.

[Ref] Henry Garrett, (2022). "Neutrosophic Duality", Florida: GLOBAL KNOWLEDGE - Publishing House 848 Brickell Ave Ste 950 Miami, Florida 33131 United States. ISBN: 978-1-59973-743-0 (<http://fs.unm.edu/NeutrosophicDuality.pdf>).

