

Descriptive Method in Spatiotemporal Simulation Observation

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Abstract

By extending metric space to expression in hash of directed graph, spatiotemporal observation could be described in matrix quantized state.

1 Introduction

In a perspective of matrix-graph relation, scalar could be represented as two row vector v_1, v_2 producting as $v_1 \cdot v_2^T$. In sense of keeping ordinal of each particle being countable, this graph-matrix relation could be interpreted in an interaction of particle as a form of energy.

2 Analytical Extension of Graph-Metric Space

While the idea of contraction in metric space gives a chance of graph being non-loss hashable in format of scalar[1], matrix gives a relation in graph, conserving its ordinal attribute. By following corollary from understanding Fermat's Last Theorem [3]:

$$\begin{aligned} \text{Let } a^n + b^n &= c^n, \\ a &= a_1 \cdot i_1 + a_2 \cdot i_2 + \cdots + a_p \cdot i_p, \\ b &= b_1 \cdot j_1 + b_2 \cdot j_2 + \cdots + b_q \cdot j_q, \\ c &= c_1 \cdot k_1 + c_2 \cdot k_2 + \cdots + c_r \cdot k_r \quad (a_{\forall x}, b_{\forall x}, c_{\forall x}, p, q, r \in \mathbf{N}^+), \quad (i_{\forall x}, j_{\forall x}, k_{\forall x} \in \mathbf{C}) \end{aligned}$$

$$\begin{aligned} \text{Let } \vec{v}_a &= (a_1, a_2, \cdots, a_p), \vec{v}_i = (i_1, i_2, \cdots, i_p), \\ \vec{v}_b &= (b_1, b_2, \cdots, b_q), \vec{v}_j = (j_1, j_2, \cdots, j_q), \\ \vec{v}_c &= (c_1, c_2, \cdots, c_r), \vec{v}_k = (k_1, k_2, \cdots, k_r) \Rightarrow (\vec{v}_a \cdot \vec{v}_i)^n + (\vec{v}_b \cdot \vec{v}_j)^n = (\vec{v}_c \cdot \vec{v}_k)^n \\ &\Rightarrow [\text{In size of matrix}] \quad ((1 \times p) \cdot (p \times 1))^n + ((1 \times q) \cdot (q \times 1))^n = ((1 \times r) \cdot (r \times 1))^n \end{aligned}$$

$$\Rightarrow n^{(\max p) + (\max q)} = r^n \quad (n \in \mathbf{N}^+) \Rightarrow n = 1 \text{ or } 2 \Rightarrow 2^2 \leq a^2 + b^2 \leq 2^{a^2 + b^2}$$

This implies a number in any complex field could be rearranged by graph conserving ordinal attribute. As atomic energy consists itself by a countable form with keeping their topological boundary, we could apply this implication to the atom which is (would be) a form of quantized energy.

3 Larger to Deep Field Observation

If every state of observation could be quantized in ordinal, relation between observation of larger to deep field could be related within. Continuing from what has been discussed in understanding of observing reality [2]:

$$\begin{aligned} \text{Assuming Field } \exists F \text{ at given period } t, \quad LFO_t(\exists F) &= \frac{SR_t - CR_t}{SR_t} \\ \Rightarrow (\text{Mostly}) \quad 0 &\leq LFO_t(\exists F, R) \leq 1 \end{aligned}$$

Note that, by preceding definition, field at period t is related mainly to convergence or divergence of spatiotemporal when observation distance is far enough. What has been said to be ‘mostly’ is that there is a possibility of distraction or extension when considering additional complex plain. Again, like what said before, LFO could be also expressed into quantized graph by their each observation.

$$n_o = n(Partial\ Observation\ \forall O\ at\ time\ t)$$

$$LFO = \left\{ \begin{array}{c} \vec{v}_1 \\ \vec{v}_2 \\ \vec{v}_3 \\ \dots \\ \vec{v}_{n_o} \end{array} \right\} \Rightarrow \text{Partial Observation } PO \cdot LFO = \text{Total Energy Observed } TEO$$

4 Extended usage of matrix

If scalar could be extended in an expression of vector and matrix as a expression of basis of span, matrix that represents energy itself gains duality in set of construction.

4.1 Ordinal perspective

By given contraction as span \vec{v} , interaction itself could be contained in an regularity in given quantized energy amount as E .

4.2 Cardinal perspective

By quantized energy amount as E , next interaction decided by given contraction amount could be spread out.

References

- [1] AMEER, E., AYDI, H., ARSHAD, M., AND DE LA SEN, M. Hybrid Ćirić Type Graphic ϕ -Contraction Mappings with Applications to Electric Circuit and Fractional Differential Equations. *Symmetry* 12, 3 (Mar. 2020), 467. Number: 3 Publisher: Multidisciplinary Digital Publishing Institute.
- [2] YOON, J. Intuitive Understanding of Observing Reality: With Extension of the Game Theory, Aug. 2022.
- [3] YOON, J. Understanding Fermat’s Last Theorem through Matrix-Graph Relation. Tech. rep., Zenodo, Dec. 2022.