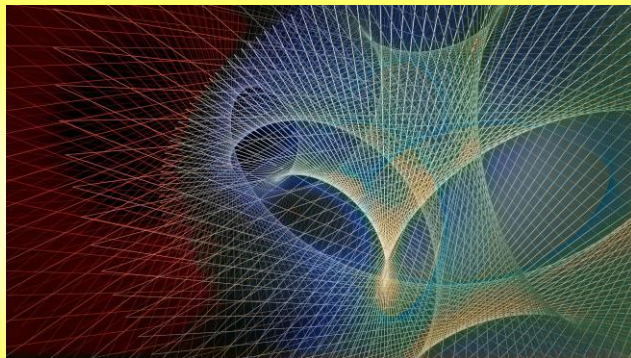


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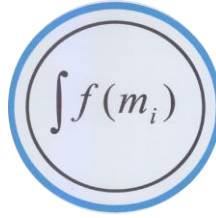
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Indigenous Healthcare Systems of Sri Lanka and Australia to
Combat Epidemics and Pandemics

W.G.S Konarasinghe, T.M.Chaudhry, K.M.U.B.Konarasinghe

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Opening Keynote Speaker



Dr.(Mrs).W.G.Samanthi Konarasinghe
Academic Director, Institute of Mathematics and Management, Sri Lanka

Topic: The Sama Circular Model on Real Life

Dr.(Mrs.) W.G.Samanthi Konarasinghe, an award-winning Scientist has served as a Statistical Consultant and a Lecturer for more than two decades. She has developed various Mathematical and Statistical Techniques for the world. They are Circular Model; Circular indicator; Coefficient of Stability; Sama Circular Model; Sama Circular Indicator. Among them, the “Sama Circular Model” is highly valued and applied in various fields. She was awarded the prestigious “IMRF Best Scientist Award” from India for valuing her contribution to the field of Statistics. Most of the real-life data follow irregular wave-like patterns; hence it is difficult to forecast them. For example; share market prices, tourist arrivals, consumer price index, unemployment, blood glucose level of a person, the water level of a river, air temperature, etc. are associated with high volatility, making them difficult to forecast. The Decomposition Techniques and AutoRegressive Integrated Moving Average (ARIMA) were the most used techniques for the purpose. However, the Sama Circular Model was superior to them in many real-life applications, making her finding unique. Dr. Samanthi is in constant demand for International Research Conferences. She has been a; keynote speaker, invited speaker, guest lecturer, guest of honor, and chief guest in Thailand, Malaysia, Singapore, India, Australia, and Germany. Her educational background is; Doctor of Philosophy (Ph.D.in Statistics), Master of Science (M.Sc in Applied Statistics), Master of Business Administration (MBA), PG Diploma (Industrial Mathematics), Bachelor of Science (B.Sc-Mathematics), Diploma in Classical Music. This rare combination of educational qualifications made her a multi-disciplinarian. It paved the path for her to become a researcher and a research consultant in various fields; Financial Markets, Medicine and Health Care, Education, Business, and more. She also researches on "Indigenous Knowledge of Sri Lanka and other countries". Dr. Samanthi is a member of; American Statistical Association (ASA), Institute of Applied Statistics, Sri Lanka (IASSL), and National Science Foundation (NSF), Sri Lanka. Also an Editorial board member of the American Journal of Theoretical and Applied Statistics (AJTAS), an Advisory member and Technical/ Scientific Conference Committee member of the Scientific and Technical Research Association (STRA) of the Eurasia Research. Most interestingly, she is not only a Scientist but also an Artist; a Violinist, Painter, Writer, Drama producer, and Actress. The membership magazine of the American Statistical Association; “AMSTATNEWS” wrote two testimonials on her,

<https://magazine.amstat.org/blog/2018/07/01/konarasinge/>

<https://magazine.amstat.org/blog/tag/w-g-samanthi-konarasinghe/>



Keynote Speaker (Mathematical Sciences)



Dr. M. Chandramouleeswaran

Professor & Head, PG Department of Mathematics, Sri Ramanas College of Arts and Science for Women, India

Topic: Semi-ring Valued Graphs

Dr. M. Chandramouleeswaran had his graduation from Kandasamy Kandari's College, Paramathi Velur and M.Sc., degree in Mathematics from Bishop Heber College, Tiruchirappalli, both affiliated to University of Madras, Chennai. He completed his M.Phil., degree in 1983 titled "Polynomial Identity Rings" and Ph.D., Degree in 2007 titled "Structure of Non-Semisimple Signed Brauer Algebras" at Ramanujan Institute for advanced Studies in Mathematics, University of Madras, Chennai. He completed PG Diploma in Computer Applications from Madurai Kamaraj University, Madurai. He has 35 years of teaching experience and 15 years of research experience in the field of Mathematics. His area of specializations includes Algebra including semirings, Fuzzy Algebra and Algebraic Graph Theory. His major contribution to the field of Mathematics is the introduction of new research domain called "S-Valued Graphs" and "S-Valued Semigraphs". He has guided 19 Ph.D., Scholars, and 36 M.Phil., Scholars. He has published 175 papers in reputed International and National Journals. He has organized 5 National Conferences. He is an editor for the journals: International Journal of Mathematical Sciences and Applications, International Forum of Pure and Applied Algebra, International Journal of Advances in Pure and Applied Mathematics, Bulletin of Mathematical Sciences and Standard – BSOMASS, International Journal of Pure Mathematical Sciences ISSN: 2297-6205, Global Journal of Advances in Pure and Applied Mathematics. He is a Referee for Journals : International Journal of Fuzzy Systems, British Journal of Mathematics & Computer Science, Indian Journal of Science and Technology, Africa Mathematica, Walailak Journal of Science & Technology, International Journal of Contemporary Mathematical Sciences, Hikari, Journal of Advances in Mathematics, Asian Research Journal of Mathematics, Kyungpook Mathematical Journal. He has published 4 books as an editor: Proceedings of National Seminar on Current Trends in Mathematics sponsored by NBHM during February 07-08, 2014, Proceedings of National Seminar on Algebra, Fuzzy Algebra & Fuzzy Graphs sponsored by UGC during January 02-03, 2015 in collaboration with IJPAM vol.98(5), Proceedings of National Seminar on Algebra, Fuzzy Algebra & Fuzzy Graphs sponsored by UGC during January 02-03, 2017 in collaboration with IJPAM Vol. 112(5), Convener of Editorial Committee for College Annual Magazine Vol.45 2014-2015. He has been a resource person for more than 12 International and National conferences. He is a Life Member of Indian Mathematical Society, Association of Mathematics Teachers in India, FATER India, and IAENG – International Association of Engineers. He has been awarded "Best Scientist Award (Mathematics)" awarded by International Multidisciplinary Research Foundation and Lifetime Mathematician Award by Forum de Mathematician.



Keynote Speaker (Biological Sciences)



Dr. Syahrilnizam Abdullah

**Associate Professor & Deputy Director of Institute of Bioscience
Universiti Putra Malaysia, Malaysia**

Topic: Disease Correction by Gene Therapy

Associate Professor Dr Syahril Abdullah is the Deputy Director at Institute of Bioscience, and a faculty member of Faculty of Medicine & Health Sciences, Universiti Putra Malaysia (UPM). He earned his undergraduate degree from Indiana University, USA. Following his MSc at UPM, he went to University of Oxford to work on his DPhil degree at the Gene Medicine Research Group, John-Radcliffe Hospital, UK. His primary research interest is in the field of gene therapy, focusing on ways to extend the duration of therapeutic gene expression. His current work is in the reprogramming of lung cells as insulin factory for the treatment of diabetes, and the use of Mesenchymal Stem Cell expressing TRAIL for lung cancer. He has published a numerous number of scientific articles in SCI indexed journal. He is also an honorary member of the Young Scientist Network - Academy of Sciences Malaysia.



Closing Keynote Speaker



Dr. K.Srinivasa Rao

Professor & Head, Department of Mathematics, SCSVMV University, India

Topic: MATLAB and Applications

Dr.K.Srinivasa Rao is presently working as a Professor & Head, Department of Mathematics, SCSVMV University, Kanchipuram, Tamilnadu, India. He has been in the teaching field for the last 27 years. He completed Ph.D in Mathematics from Acharya Nagarjuna University, India , M.Phil., from Madurai Kamaraj University, India, M.Sc., from JNT university, India, PGDCS from University of Hyderabad, India. His primary research focuses on Chemical Graph Theory and Algebra. He published more than 45 research articles in reputed journals. He delivered 53 talks as a invited speaker, resource person, guest lecture. Five scholars completed their Ph.D under his guidance and 4 are pursuing.22 students completed their M.Phil degree under his guidance. He attended more than 36 Conferences, Seminars and organized 11 research programs.He has been continuing his editorial positions in 6 international scientific journals, and is the referee for more than 15 journals. He was awarded the prestigious IMRF Best Scientist Award from IMRF, India for valuing his contribution to the field of Mathematics and also he got best teacher award from Sri Chandrasekharendra Saraswathi Viswa Mahavidyala, India for the academic year 2016-17. He is a MATLAB expert and has served as a resource person at more than 33 workshops organized by different educational institutes all over the globe. Also he had written two books on MATALB. Apart from this, he is a Chairman: Board Studies, Department of Mathematics and Statistics and Information Cell, also he is a Nodal Officer, UGC/AISHE, SCSVMV



THE SAMA CIRCULAR MODEL ON REAL LIFE

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ABSTRACT

Mathematics is a Universal language. The term "mathematics", is taken from the ancient Greek word; "*mathema*"; meaning of it is the "subject of instruction". It is the key to understand all sciences. Mathematical modeling plays a vital role in real life. It converts a real world problem into mathematical language and helps in decision making. Mathematical models are classified in many ways. Some of them are, Static; Dynamic; Deterministic and Stochastic models. A model is said to be "Static" when it does not have time- dependent component. In contrast, dynamic models contain time-dependent component. Deterministic models are not associated with any randomness whilst the stochastic models does. Hence stochastic models or Statistical Models are more applicable in real life. The Statistical models can be broadly classified into two parts: univariate statistical models and multivariate statistical models. A univariate statistical model is an equation or set of equations explaining the behavior of a single random variable over time. The univariate statistical models also known as Time Series models. Time series data comprises several components; Trend, Seasonal variations, cyclical variations and irregular variations. These series follow irregular wave like patterns. This type of data is common in the fields of, Meteorology, Agriculture, Finance, Economics, Education, Healthcare and more. The Decomposition technique and the Auto Regressive Integrated Moving Average (ARIMA)/Seasonal Auto Regressive Integrated Moving Average (SARIMA) are the widely applied methods for forecasting such a series. Yet these techniques are unable to model the cyclical variation and they have some other weaknesses. According to the literature, modeling cyclical variation is highly important and crucial. Some researchers have attempted the Artificial Neural Network for the purpose, yet the success of them were doubtful. There was no Statistical techniques for the purpose. The Sama Circular Model (SCM) is a recently joined member to the family of forecasting techniques, developed on Newton's law of Circular Motion, Fourier transformation and Least Square Estimation. Indeed it is a frequency domain model. The SCM is capable in capturing all the components of a time series; Trend, Seasonal and Cyclical. It has been successful in various real life applications and was superior to the other techniques.

Keywords: Stochastic Models, Time Series



SEMIRING VALUED GRAPHS – AN INTRODUCTION

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Sri Ramanas College of Arts and Science for Women, Aruppukottai, Tamil Nadu. India.

ABSTRACT

A detailed survey of the theory of semirings and their applications can be found in monograph by Jonathan Golan. In his monograph Golan has introduced the notion of R -valued graphs where R is a semiring nothing more has been dealt. Motivated by his we started the study of S -valued graphs in the year 2015. As a team work that includes our research scholars, we have developed many concepts analogous to crisp graph theory in S -valued graphs developed so far has introduced many notions such as regularity of S -valued graphs, irregularity conditions, different types of dominations, homomorphism of S -valued graphs and also the theory of products on S -valued graphs and their corresponding group properties. It claimed that the theory of S -valued graphs is the generalization of both the crisp graphs and the theory of fuzzy graphs. If no values from $[0,1]$ and a semiring are assigned to the vertices and edges of a graph the theory coincides with the crisp graph theory. On the other hand if the vertices and/or edges are assigned values from $[0,1]$ the graph is called a fuzzy graph. $[0,1]$ can be considered as a semiring by defining addition and multiplication of real numbers between 0 and 1. However all semirings need not be mapped onto $[0,1]$. Thus we can observe the every fuzzy graph can be considered as S -valued graph but we cannot consider a S -valued graph as a fuzzy graph. The theory of S -valued graph develop so far, can be identified to be useful in the theory of cryptography, optimization and the theory of social networks. In this talk we thus discuss the underlying concepts of S -valued graphs, the interesting results that we have proved and certain applications in cryptography, social network analysis and DNA Properties.



DISEASE CORRECTION BY GENE THERAPY

Dr. Syahril Abdullah

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Universiti Putra Malaysia, Malaysia

ABSTRACT

Most exciting biotechnology advances of recent times are occurring within the membranes of cells, where the cells are manipulated for disease amelioration or correction. Currently, scientists are using the tools of biotechnology to manage diseases, especially those that occur or can be controlled at genetic level. One of the ways where biotechnology can be used to cure diseases is in the field of gene therapy. Much attention and considerable promises have been given to gene therapy following its first clinical trial in 1990. Since then, the idea that human genetic diseases will become amenable to correction has become widely accepted. Lately, a great number of gene therapy clinical trials have demonstrated remarkable therapeutic benefits with promising safety records. They provide proof for the long-sought promise of gene therapy to deliver cure for some terminally or severely disabling diseases. These have led to the approval of gene therapy in China, Europe and the United States. Despite the current success, many fundamental issues and new approaches will need to be resolved and developed to further improve the safety and efficacy of such treatment in humans. This talk will introduce the concept of gene therapy and review its progress since its conception in 1972, to its historic endorsement by the U.S Food and Drug Administration (FDA) in 2017. The processes in gene therapy research will also be elaborated.



ROLE OF MATRIX IN MATLAB

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ABSTRACT

MATLAB (MATrix LABoratory) is an efficient user-friendly interactive software package, which is very effective for solving engineering, mathematical and system problems. This is a high-level programming language with data structures, control flow statements, functions, output/input, and object-oriented programming. It permits both, rapidly creating speedy throw-away programs, and creating complete, complex and large application programs. MATLAB provides an interactive environment that allows iterative exploration, design, and problem-solving. It is a bunch of tools that a programmer can use. It includes abilities for handling the variables in the workspace & importing/exporting data. It also contains tools for development, handling, debugging, and profiling MATLAB files. It offers built-in graphics useful for data visualizing, and tools for generating custom plots. MATLAB holds high-level instructions especially for creating two and three-dimensional data visualizations, animations, image processing, and graphical presentation. This moreover includes low-level instructions that allow users to fully modify the appearance of graphics on top of to build thorough GUIs (Graphical User Interfaces) on MATLAB. It offers a huge library of mathematical functions needed for computing statistics, linear algebra, numerical integration, filtering, Fourier analysis, optimization and solving regular differential equations. MATLAB Application Program Interfaces (APIs) allow users to write C / C++ and Fortran programs that directly interact with MATLAB. These include options for calling programs from MATLAB (dynamic linking), reading and writing MAT-files, and for calling MATLAB as a computational engine. The users can utilize MEX API and Matrix API functions to interact with data within the MATLAB workspace. A Toolbox is a set of functions designed for a specific purpose and compiled as a package. These Toolboxes include MATLAB code, apps, data, examples and the documentation which helps users to utilize each Toolbox. Users can compile MATLAB files to create toolboxes if they require sharing with others. There are separate Toolboxes available from Mathworks, to be used for specific purposes, for example, text analytics, image processing, signal processing, deep learning, statistic & machine learning, and many more. MATLAB allows to 'export' machine learning models anywhere including Java, Microsoft .NET, Excel, Python, C/C++, CUDA (parallel computing platform and programming model developed by Nvidia), enterprise IT systems, or the cloud. Or deploy models to MATLAB Production Server for integration with web, desktop, database, and enterprise applications. In this talk, I would like to emphasise the importance of matrix operations in MATLAB



ACTION OF A SEMIRING TO ENCRYPT ASYMMETRIC KEY – ELGAMAL

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ABSTRACT

In 1934, H.S.Vandiver formally defined the notion of semiring which is defined as a nonempty set S having two binary operations addition(+), multiplication(\cdot) such that S under addition is a monoid, S under multiplication is a monoid and multiplication distributes over addition on both sides. Even though the concept of semiring was introduced in 1934, the study on semirings got more attraction only in early 1960's. Since then many research works have been continued because of the applications of semirings in various fields of Mathematics such as optimization techniques, automata theory, networks, cryptography and so on. The applications of semiring in public key cryptography were initiated by Atani, Monico and so on. Cryptography is a method of protecting information and sharing it in more secured way so that the information cannot be accessed by a third party. It has two types namely, symmetric key cryptosystem and asymmetric key cryptosystem. The symmetric key cryptosystem contains only one secret key common to both the parties whereas the asymmetric key cryptosystem contains two secret keys namely private key and public key. The public key exchange between two parties in a more secured way was initiated by Diffie and Hellman. In their seminal paper, Diffie and Hellman, in the year 1976, proposed a protocol to share secret key in cryptography using discrete logarithmic problem. The idea of using semigroup actions for the purpose of building one way trapdoor function has been used by several researchers. In 2017, Sundar, Victor and Chandramouleeswaran, discussed a generalization of Diffie Hellman key exchange protocol, in which they considered the action of multiplicative semigroup of a semiring on some finite semimodule over a semiring. The same procedure was applied to Elgamal encryption by Thiruveni in the year 2018. In our earlier papers we extended these works in multiplicative subsemigroup and multiplicative left ideals of a semiring. This paper discusses the secret key sharing of Elgamal procedure using the action of exponential semiring over its multiplicative left ideal. A semiring is called an exponential semiring if it satisfies: (i) $b^{s_1} \cdot d^{s_1} = (bd)^{s_1}$, (ii) $b^{s_1 \cdot s_2} = (b^{s_1})^{s_2}$, (iii) $b^{s_1 + s_2} = b^{s_1} \cdot b^{s_2}$, (iv) $b^1 = b$ where $b, d \in (S \setminus \{0\}, \cdot)$, $s_1, s_2 \in S$.

Keywords: Semiring, Multiplicative left ideal, Public key, Encryption and decryption.



SYNTHESIS OF N-GLYCANS FOR IMMUNOLOGICAL STUDIES

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ABSTRACT

Over the past few decades, immunologists have begun to try and develop vaccines against tumour cells. These vaccines typically contain an antigen that is present only on the tumour, which can then activate tumour-specific cytotoxic T-cells. One of several approaches to developing an effective vaccine involves targeting an endocytic receptor on antigen-presenting cells, which results in enhanced antigen cross-presentation. In these studies, the mannose receptor was used as an endocytic receptor. The mannose receptor (MR) can function in two ways on antigen-presenting cells; either to enhance general antigen uptake and/or to promote cross-presentation of the antigen. To date, there is no clear picture of the factors that are important in controlling antigen cross-presentation. The main aim of this project was to determine which structural parameters of the glycoprotein-antigen conjugate resulted in enhanced cross-presentation upon MR-ligation. This thesis therefore concerns the chemoenzymatic synthesis of defined glycopeptides and glycoproteins as chemical biology tools to help unravel the role(s) of the MR in antigen cross presentation. Herein N-glycans were produced either via total or semi-synthesis, and then enzymatically or chemically coupled to give homogeneous glycopeptides and glycoproteins. Enzymatic degradation of locust bean gum provided a Man β (1 \rightarrow 4)Man disaccharide building block which in turn allowed the synthesis of N-glycan disaccharide and tetrasaccharide oxazolines. This synthetic route was considerably shorter than all other previously reported syntheses of these two compounds. In addition, large N-glycan oligosaccharide oxazolines, Man₉GlcNAc-high mannose (from soybean) and sialoglycan-complex (from egg yolk), were accessed by semi-synthetic approaches. GlcNAc-Asn and GlcNAz-Asn were employed as model acceptors to represent the minimal structure of N-linked glycoproteins; the disaccharide, tetrasaccharide, Man₉GlcNAc, and sialoglycan oxazolines were all used as donors. The structurally modified GlcNAz acceptor (Fmoc-Asn-GlcNAz) was found to be a suitable acceptor substrate for glycosylation catalysed by endo- β -N-acetyl-glucosaminidase (ENGase) enzymes, indicating that in future its incorporation into larger peptides may provide access to bio-orthogonally tagged antigens and allow more detailed investigations of antigen cross-presentation biology. Native glycoforms of immunological probe peptides were made by the use of ENGase enzymes, which attached sugar oxazolines to a peptide (OVA247-264A5K) containing a GlcNAc handle. Non-native glycoforms of the same probes were made by the use of click chemistry, to attach sugars to peptides (OVA247-264A5K) which contained a propargyl handle. Finally, glycoprotein remodelling of ovalbumin (OVA) was achieved with the N-glycan tetrasaccharide oxazoline donor using WT Endo A as catalyst. The synthesis of these glycopeptides and glycoproteins in homogenous form should facilitate future analysis to help define the pathway taken by an antigen after uptake by the MR.



FORECASTING COVID -19 OUTBREAK IN PHILIPPINES

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ABSTRACT

The Philippines have reported the second highest amount of infected cases among Southeast Asian countries. The country exceeds 330,000 cases since 22nd January 2020 and still reporting a high volume of infected cases. The outbreak of the pandemic in the future might be doubtful. The governors have to understand the future behavior of the outbreak and prepare to manage the spread of the pandemic to make sure the sleek function of the country. Hence, the study has designed to forecast the amount of infected cases of COVID -19 within the Philippines to understand the outbreak of the pandemic. The daily confirmed cases of COVID-19 of the Philippines for the amount of 22nd January 2020 to 27th September 2020 were obtained from the world Health Organization (WHO) database. Time series plots and Auto Correlation Functions (ACF) were used to examine the pattern of the series. The trend models and Double Exponential Smoothing (DES) techniques were tested to forecast the spread of the pandemic. The Anderson Darling test, ACF, and Ljung-Box Q (LBQ)-test were used to test the validation criterion and fit the model. The forecasting ability of the models was assessed by three measurements of errors; Mean Absolute Percentage Error (MAPE), Mean Square Error (MSE), and Mean Absolute Deviation (MAD) in both model fitting and verification process. The results of the study revealed that the trend models were not satisfied with the model validation criterion. But the DES was satisfied with all criteria and the performance of the model was extremely high. Both relative and absolute measurements of errors were very low under the model fitting and verification process. It had been concluded that the DES is the most suitable model to forecast the infected cases within the Philippines. Due to the prevailing situation and the predicted values of the DES, ensures that the Philippines took over 5 years to combat COVID-19. It is recommended to model the outbreaks of the pandemic in other Southeast Asian countries furthermore.

Keywords: Infected Cases, Trend Models, DES, COVID-19



YOGA BASED MINDFULNESS THERAPY

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ABSTRACT

The mindful way to well-being is simple, eternal and life-changing. It is a modern practice that involves paying full attention to all experiences; it is a state of universal spiritual transcendence which has no religious dimension. Mindfulness is recognizing emotion and feeling without being overwhelmed or caught by it, a sense of identity, living more in present than in the past, a way to cultivate happiness and gratitude. Mindfulness changes the identity about oneself and brings positive attitude toward people surrounding him. Yoga in its origin from Indian Psychology and is used for personal transformation. The word 'yoga' is derived from the post 'yuj' which means to bind or to yoke. According to literature first level is connecting the body and mind, the second level mind and consciousness and third level aims at unifying the manifest consciousness of the person and the consciousness as such. The Objective of the present study is to assess how asana, pranayama, dharna ,dhyana act among individuals, especially among substance users. Asana refers to the establishment of a steady, comfortable posture which enhances relaxation, reduces tension and can lead to cognitive absorption and intellectual assimilation. Pranayama refers to the restraint of the impulses and reduces psychosocial distractions .Dharna is usually referred to as concentration-the binding of consciousness into a fixed point. Dhyana is meditation, deeper than concentration. Here duration is prolonged than dharna. In a reputed Non Governmental Organization Kolkata mindfulness therapy are conducted in following ways. In the morning residentially admitted substance abusers are instructed to do ustrasana, bhujangasana, sasangasana and uttitapadmasana with the help of therapist. Just like raindrop falling into the pond, sensations, emotions become gradually deep and lucid. Through Pranayama they are taught to notice thought without judgment. Pranayama enable them to restore psychosocial equilibrium. Dharana and dhyana are done in the following way - 'Sit down in a circle' 'Look closely at the circle printed on the piece of paper.' 'Now close your eyes' Attend to your sensations, feelings and thoughts'. 'Give a pause-feel inner silence'. 'Look back what you have experienced'. Mindfulness is an inner guiding light that help us to discover ourselves at any moment of our meditative journey. Shifting our focus away from the negative, towards the positive, we could feel positive emotions-happiness, joy, and hope, gratitude, love, surrender, and acceptance and so on. Thus yoga-based mindfulness therapy is the need of the hour where the lost man could find their ways beautifully.

Keywords: Yoga, Psychotherapy, Substance abuse



CHROMATIC POLYNOMIALS OF S-VALUED GRAPHS

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ABSTRACT

Coloring of graphs is a most important concept in which we partition the vertex (edge) set of any associated graph so that adjacent vertices (edges) belong to different sets of the partitions. In other words colouring problem is considered as grouping the items of interest as few groups as possible so that incompatible items are in different groups. Colouring of graph is one of the most important research area of combinatorial optimization due to its wide applications in real life, viz. management sciences, wiring printed circuits, resource allocation, scheduling problems, etc. These problems are modelled by appropriate crisp graphs and solved by colouring of these graphs. In the conventional graph colouring problem, minimum number of colours is given to the vertices of the graphs such that no two adjacent vertices have the same colours. A k -colouring of graph G is an assignment of integers $\{1, 2, \dots, k\}$, (the colours) to the vertices of G in such a way that the neighbours receive different integers. The chromatic number of G is the smallest k such that G has a k -colouring. There are several interesting practical problems that can be modelled by graph colouring, such as, scheduling and assignment problems. The theory of semirings was first introduced by H.S. Vandiver, while studying the theory of ideals in commutative rings, in 1934. In his book titled "The Theory of semirings and their applications" Jonathan Golan introduced the notion of R -valued graph on any non empty set V where R is an arbitrary semiring. The elements of V are called the vertices and a R -valued relation g on V is called an R -valued graph G . He has assigned the nonzero values from the semiring R to the edges of G . Thus, Golan assigned the values from a semiring R only to the edges of G . Motivated by this, in the year 2015, Chandramouleeswaran and others introduced the notion of Semiring-valued graphs (simply called S -valued graphs). That is, graphs whose vertices and edges are labelled with values from a semiring S . Thus, they assigned S -values to every vertex of a given graph G and using the canonical pre-order existing in the semiring to compare the S -values of the end vertices of any edge, assigned the S -value for the edge under consideration. In our earlier work we studied the vertex and edge colouring of S -valued graphs. This work defines the chromatic polynomials of a S -valued graph by considering different possible colouring from a given colour class of k -colours.

Keywords: S -valued graphs, Vertex-coloring, Chromatic number, Chromatic polynomials



INDIGENOUS HEALTHCARE SYSTEMS OF SRI LANKA AND AUSTRALIA TO COMBAT EPIDEMICS AND PANDEMICS

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ABSTRACT

Indigenous knowledge or local knowledge is the unique knowledge confined to a particular geographical location, culture or society. It is rooted in a particular place and set of experiences, and generated by people living in those places. This knowledge is transmitted from generation to generation by oral, imitation or demonstration. Sri Lanka is one of the few countries in the world which has a recorded history over thousands of years, rich with traditional knowledge in healthcare and medicine. The Sri Lankan traditional health system was a mixture of indigenous medicine (Desheeya Chikithsa) and Ayurvedic medicine. “The controlled mind controls the body, and leads to a controlled life” was the theme of the traditional system. They have adopted the prevention of diseases than curing. The history of Australia goes back to 40,000 to 70,000 years. Indigenous Australians had a lifestyle enduring spiritual and artistic traditions. They lived in harmony on their own simple, but powerful control systems in every aspect. However, the Western occupation in both countries seriously damaged the growth and the use of indigenous knowledge of them. The indigenous healthcare systems were replaced by the Allopathic medicine or science-based modern medicine. Today the entire world suffers from various epidemics and Covid-19 pandemic. The allopathic system is successful to a great extent in epidemics, but become helpless and clueless at the pandemic. The World Health Organization (WHO) also has identified the importance of traditional knowledge in defeating pandemic. Hence, the study was focused to find the indigenous knowledge of Sri Lanka and Australia to defeat epidemics and pandemics. The stratified sampling technique was adopted for data collection, the sample contains 60 individual. The strata were; Sri Lankan citizens, Indigenous Australians, Australian citizens or permanent resident holders with Asian origin. Data collection was done by personal interviews and e-surveys using a self administered questionnaire. Results revealed that the parents or grandparents of 92% of the respondents have used home remedies for various ailments. They have used medicinal foods and drinks to increase the immunity and prevent diseases. Medicinal plants were extensively used to stop spreading diseases. Social distancing was strictly kept within and outside home in epidemics or pandemics. The majority of the respondents still use some of those methods, but find it difficult to get the optimum benefit due to lack of availability in herbal plants. 63% of them prefer indigenous treatments than allopathic treatments and believe that the indigenous treatments have no side effects or after effects. However, no one refused allopathic treatments; 71% of the participants go for it for fast relief. According to them a combination of traditional and modern medicine would be the best option for a healthy world. They unanimously blame the authorities for not paying enough attention for protecting indigenous healthcare systems.

Keywords: Indigenous health system, Allopathic medicine

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