Kristu Jayanti College

AUTONOMOUS Bengaluru

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DEPARTMENT OF STATISTICS

Virtual National Conference on Theoretical and Applied Statistics

Theme - Recent Advances in Statistical Theory and Computing

9th &10th February 2021

in association with

NSO INDIA

Data for Development

National Statistical Office (NSO)

Ministry of Statistics and Programme Implementation (MoSPI)

Government of India

Department of Statistics,
Bangalore University

Bengaluru North University

Publication Partner

Advances and Applications in Mathematical Sciences

An emerging WoS and UGC CARE List Journal

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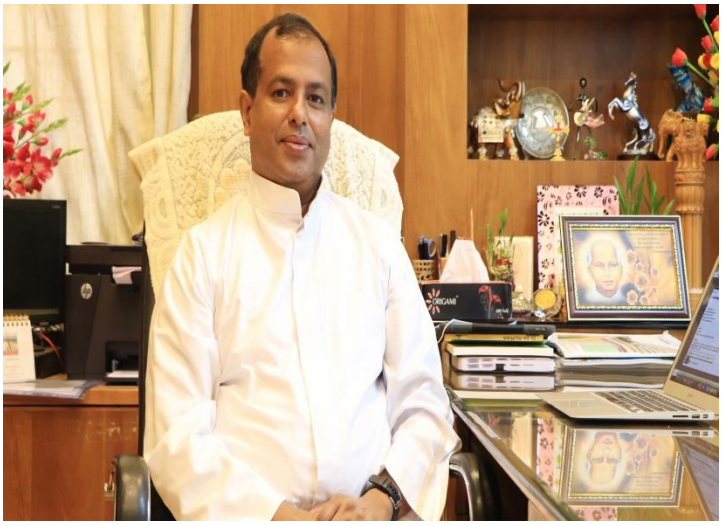
MESSAGE FROM PRINCIPAL



Research activities across all sciences are the fore runners of inventions. The field of statistics is witnessing an exceptional demand due to the advancements in software's. I am extremely delighted that the Statistic Department of Kristu Jayanti College (Autonomous), Bengaluru is organizing a National conference on Theoretical and Applied Statistics. The department is collaborating with National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI), Bangalore University and Bengaluru North University. The theme for the conference- *Recent Advances in Statistical Theory and Computing* is very relevant as there is a surge in research around the area of Data science which closely related to Statistics.

Any educational institution can provide encouragement and support to research by establishing a suitable platform for the research community, to interact with each other and to share the knowledge. With this objective, "National Conference on Theoretical and Applied Statistics - NCTAS," was organized last two year which received an overwhelming response. It is encouraging to know that NCTAS 2K21 is planned to provide the same benefits and learning experience to all the participants. I am sure that the sessions on different domains, keynote addresses from eminent professors and opportunity to network with the researchers will help the participants immensely in their research career.

I believe strongly that, this event will stand as a great source of knowledge for students, academicians and researchers. With great pleasure and pride, I convey my best wishes to the organisers and participants of NCTAS 2K21.

Fr. Dr. Augustine George, Principal

Kristu Jayanti College

MESSAGE FROM DEAN

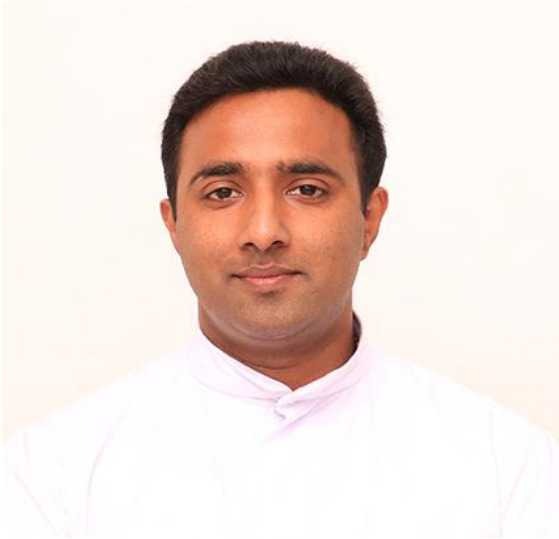
The importance of data, statistical theories and its applications have become very relevant to nearly every area of our lives. Most of the fields that involve decision making require statistical methods. Specialties have emerged to apply statistical theory and methods to various disciplines. It is to deliberate on this field that is continuously evolving and making significant impact on the lives, the Conference on Theoretical and Applied Statistics is being jointly hosted by the Department of Statistics, Kristu Jayanti College, National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI), Department of Statistics, Bangalore University and Bengaluru North University. This Conference will bring together leading professionals in statistics, research scientists, academicians and experts to share their experiences, research results and methods and developments in Statistics and its contemporary applications. The breadth of the scientific program is impressive, as it covers important advances across the field of statistics.

Appreciations to the Convenors and all members of the Organising Committee of the Conference for leading the drive towards this conference.

We are confident that this forum will foster discussions and hopes to inspire the delegates to initiate collaborations within and across disciplines for the advancement of Statistics.

Dr. Calistus Jude A. L.
Dean, Faculty of Sciences
Kristu Jayanti College

MESSAGE FROM HEAD OF THE DEPARTMENT



I am pleased to know that the Department of Statistics is organizing a National conference on **Theoretical and Applied Statistics (NCTAS- 2021)** on 9th and 10th February 2021. The conference is on a truly relevant theme- *Recent Advances in Statistical Theory and Computing*. This is the third consecutive year that the department is organizing conferences. This year there are a few peculiarities; the conduct of the conference is going to be in collaboration with National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI), Bangalore University and Bengaluru North University. Second is that the presented papers will be considered for possible publication in a reputed journal that is indexed in UGC_CARE list as well as Web of Sciences- ***Advances and Applications in Mathematical Sciences***. This conference will have deliberations by 11 eminent resource persons who are stalwarts in their domains in the field of theoretical as well as applied Statistics. I am sure the participants will benefit a lot by gaining knowledge from such great researchers and academicians.

I appreciate the organizing committee under the leadership of the conference convener Assistant Professor. Liji George and wish all the very best to all the participants. Looking forward for an enriching learning experience

With warm regards

Fr. Lijo P. Thomas
Head of the Department
Kristu Jayanti College

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Dr. Parameshwar V.Pandit
Professor and Chairperson

MESSAGE FROM CONFERENCE CHAIR

Statistical Science has become indispensable in every walk of research in all fields of Science and Technology, Social Sciences and Humanity. This has made the subject Statistics popular coupled with computation and applicability. Scientific community needs the help of Statistics/Statisticians for validating their findings. In present day, Data Science is picking up which cannot be developed without Statistics.

As conference Chair, I am glad to welcome the delegates to the National Webinar organised by Department of Statistics, Kristu Jayanti College, Bengaluru jointly with Department of Statistics, Bangalore University and Bengaluru North University. The conference intends to cover a wide spectrum of topics like Inferential Statistics to Applied Statistics, including Statistical Techniques using Data Depth concepts, Time Series Analysis etc. it is worth mentioning that the Webinar will have keynote address by Prof. D.T. Shirke, Vice-Chancellor, Shivaji University, Kolhapur and a special talk by Prof. N. Balakrishna, CUSAT, Kochi. I am happy to have many other eminent speakers delivering their talks in the webinar. It is overwhelming to note that we have received about 50 contributory papers from young researchers.

I am sure this webinar will be a good platform for fruitful outputs and research discussions.

I welcome again all the delegates.

(Parameshwar V. Pandit)

MESSAGE FROM CONFERENCE CONVENERS

Department of Statistics, Kristu Jayanti College, Bengaluru North University in collaboration with National Statistical Office (NSO) under the Ministry of Statistics and Programme Implementation (MoSPI), Department of Statistics, Bangalore University, Jnana Bharathi Campus is organizing the third National Conference on Theoretical and Applied Statistics will focus on the theme "***Recent Advances in Statistical Theory and Computing***"

The major objective of this virtual Conference and is to provide a forum to share and discuss ways to improve access to knowledge, promote interdisciplinary collaborations and learning through interaction with researchers, academicians, industrialists and students.

The conference has received over 40 articles that describe significant advances in the area pertaining to Graph Theory, Actuarial Statistics ,Agricultural Statistics, Artificial Neural Networks, Bayesian Inference, Bioinformatics, Data Mining, Design of Experiments, Distribution Theory, Econometrics, Mathematics, Applied Mathematics, Medical Statistics, Multivariate Analysis, Operations Research, Probability Theory, Reliability, Robust Statistics, Sampling Theory, Statistical Quality Control, Stochastic Modeling, Stochastic Process, Survival Analysis, Time Series Analysis, etc

We are extremely thankful to the Management of Kristu Jayanti College, the officials at National Statistical Office (NSO) South Zone, Vice Chancellors of Bangalore University and Bengaluru North University, Key Note Speakers, Invited Speakers, Advisory Committee Members, Reviewers, Session Chairs, Participants, Organizing Committee Members and all those who have helped us to organize this National Conference.

We thank our Publication Partners Mili Publications, India for publishing the peer reviewed papers in ***Advances and Applications in Mathematical Sciences*** - an emerging WoS and UGC Care List Journal.

Ms. Liji George, Assistant Professor, Kristu Jayanti College
Dr. Suresh R., Assistant Professor, Bangalore University

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Invited Talks

Contributory Papers

STATISTICAL PROCEDURES BASED ON DATA DEPTH

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Abstract: A notion of data depth is used to measure centrality/outlyingness of a given point with respect to a given distribution or data cloud. Several Statistical Procedures have been proposed for multivariate distributions. In the present talk, the notion of data depth and some of the statistical procedures based on it will be discussed. Particularly, graphical tools for the comparison of two or more multivariate populations and their applications in testing of the hypothesis, classification problem and control charts will be discussed.

Keywords: data depth, graphical tools, testing of hypothesis, control charts, classification.

TIME SERIES MODELS WITH STABLE INNOVATIONS AND THEIR APPLICATIONS

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Abstract: The time series models with errors (innovations) following non-Gaussian distributions are found to be more suitable in dealing with practical situations. When the observed data show a tendency to follow heavy-tailed distributions such as stable, the classical tools such as autocorrelation function/ partial autocorrelation functions are not defined and their sample counterparts cannot be used for model identification. The data of this type occur in several areas such as finance, environment, signal processes, etc. In this talk we discuss suitable methods for identification and estimation of autoregressive models with symmetric stable innovations using auto-covariation function. A recursive algorithm is proposed for generalized Yule-Walker estimation of autoregressive coefficients and partial auto-covariation function. We also propose a new information criterion, useful for consistent order selection. Applications of the proposed methods are illustrated using observations simulated from autoregressive models with symmetric stable innovations as well as by analysing a set of real data.

MEASURES OF UNCERTAINTY AND INFORMATION CONTENT OF RANKED SET SAMPLING WITH UNEQUAL SAMPLES

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Abstract: Ranked set sampling with unequal set sizes (RSSU) is some of the important variants of ranked set sampling with equal set sizes (RSS). The sets that arise naturally in many applications are typically of different set sizes. In this paper, we consider information measures of RSSU in terms of Shannon entropy, Renyi entropy and Kullback-Leibler (KL) information. We also compare the uncertainty and information content of RSSU with simple random sampling (SRS), ranked set sampling (RSS) and maximum ranked set sampling with unequal samples (MRSSU), when the underlying distributions are uniform and exponential. Finally, we develop some characterization results in terms of cumulative entropy and failure entropy of RSSU.

OPTIMAL CONTROL THEORY AND ITS APPLICATIONS

Dr. S. B. Munoli
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Abstract: Optimal control theory, a mathematical optimization method for deriving control policies is discussed. The method is due to the work of Lev Pontryagin and Richard Bellman in 1950s. An optimal control is a set of differential equations describing the paths of control variables that minimize objective function (or maximize also as in case of utility function) which is called as performance index. Formation of Hamiltonian function H, introduction of Co-state variables, the Pontryagin' maximum principle are discussed with examples. Application of Optimal control theory to unemployment problem is presented.

Key words: differential equation, control variables, optimal control, Pontryagins maximum principle, unemployment, vacancies

U-STATISTICS FOR TWO-SAMPLE SCALE PROBLEM

Dr. (Smt.) Sharada V. Bhat
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Abstract: Two-sample scale problem is a widely known problem in nonparametric inference. It compares variances of two populations and has applications in various fields like engineering, life sciences, industries, medical science, etc. Here, a number of classes of distribution – free (df) tests based on U-statistics approach to two-sample scale problem are discussed. Alternative expressions in the form of ordered ranks are presented. Performance of some classes of tests in terms of Pitman asymptotic relative efficiency (ARE) and empirical power are studied. Examples are provided to illustrate members of these classes of tests.

ROLE OF ACCEPTANCE SAMPLING PLAN IN SMALL SCALE INDUSTRIES

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Abstract: Acceptance Sampling plans are widely studied in industries to control product quality and to maintain the standards in manufacturing products. Nowadays small-scale industries are highly concentrating on high-quality products which can be executed through the statistical technique for maintaining the good quality products for its life of the product. In manufacturing industries, the products are assembled or aligned to check whether the occurrence of defects may occur or not further it can be verified with an excess number of zeros occur in sampling inspection. Bayesian sampling procedures have to be designed for the execution of the sampling plan under the condition of a zero-inflated Poisson model. Further, it is studied to take a precise decision and it can be certainly reduced the error rate than the regular Poisson model. The Quick Switching sampling system is studied to execute the sampling procedure for deciding the conditions of previous knowledge is available about the production. Here various sampling plans can be studied as reference plans. Gamma-ZIP model is applied, to safeguard both the producer and consumer risk at the same time which minimizes the risk in the sampling plan. Few designing methods are given for the industrial shop floor conditions with suitable illustrations are provided.

CLUSTER ANALYSIS USING R

Dr. Boby John
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Abstract: The objective is to provide hands-on experience to the participants on carrying out cluster analysis using R package so that the participants will acquire the knowledge and experience on performing cluster analysis using R themselves as well as can teach others. The program starts with an introduction to cluster analysis, discuss important different types of linkages and demonstrate step by step procedure for hierarchical and K-means cluster analysis using R. The commonly used procedures for identifying optimum number of clusters also will be discussed.

DEVELOPMENT AND ASSESSMENT OF PSYCHOMETRIC SCALES

Dr. Gopukumar Kumarpillai
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Abstract: Psychometrics and measurement are essential for all aspects of psychological research. Scale construction procedures in research methodology helps in social science studies, while evaluating performances of the people we generally follow the method of preparing the opinionnaire (or performance/attitude/personality scale) in such a way that the score of the individual responses assigns him/her a place on a scale. Development of good psychological test requires thoughtful and sound application of well-known principles of test construction. Before the real work of test development, the test constructor take some broad decisions about the major objectives of the test in general terms and population for whom the test is intended and also indicates the possible conditions under which the test can be used and its important uses. The present lecture provides theoretical and practical details in scale development and psychometrics for producers and consumers of social Sciences and humanities research. It covers basic principles, practices, and processes in scale construction, scale evaluation, scale use and interpretation of research results in the context of psychological measurement. It explains fundamental concepts and methods related to dimensionality, reliability, validity, preparation of norms for the final test, preparation of manual, and reproduction of the test. This lecture is intended to raise awareness and understanding of issues that will enhance even further the generally good conduct and interpretation of research in social, educational, cognitive and personality psychology.

OFFICIAL STATISTICS

Dr. P.T. Subha, ISS
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Abstract: The Indian Statistical System presently functions within the overall administrative framework of the country. The Indian federal structure has influenced the organisation of the statistical system as well. The division of administrative functions between the Government of India and the State Governments is on the basis of the subject classifications under the Union, State and Concurrent Lists as detailed in the Constitution of India.

1. How the statistical system is functioning in the federal set up? Let's talk about it.
2. We will discuss about the role of statisticians in the official statistical system.
3. Statistics as a subject as well as a tool has gained lot of importance in the recent times opening plenty of job opportunities for the students. Let's have a look at where the knowledge in Statistics can take you.

MARKOV MODELS FOR DISEASE PROGRESSION

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ABSTRACT

Studying the disease progression through the stochastic models is the more appropriate. This talk is focused on making use of Markov Processes in the growth and progression of diseases of different states. Transitions from one state to another state has to be modeled for better understanding of the more prevalence state. This study has given emphasis on exploring the transition probability matrices so as exploring the probability distributions for successive happening of considered states. The dynamics of model behavior is studies through different statistical measures from the developed model and derived probability distribution. This study is having the scope discussing different aspects of disease more specifically with statistical analysis. Discrete Time Markov Chains and Continuous Time Markov Chains are the vital tools that have been used for obtaining the mathematical relations of the measures.

Key Words: DTMC, CTMC, Disease Progression, Markov Models, TPM

AN OVERVIEW OF STATISTICAL METHODS IN GENOMICS OF LONGEVITY

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Genetic experiments using high-throughput omics technologies yield large volumes of high dimensional data. Analyses of these datasets involve computational challenges but at the same time provide us with several opportunities to develop novel mathematical/statistical models.

Human longevity is complex phenotype which is influenced by several genetic and environmental factors. In this talk, I will introduce some of the omics and epidemiological datasets used in the study of age-related phenotypes. I will also provide preliminary details about some of the public repositories of omics data. The idea is to motivate the researchers to make use of publicly available genomics resources to develop novel statistical/mathematical models for the analysis of genomic data.

For some concrete examples, I will introduce heritability, genome-wide association studies (GWAS) and other post-GWAS statistical applications using the datasets from our centre. I will also mention importance of high-performance computational infrastructure used in the analysis of bigdatasets.

EXPONENTIALLY TIME AND PRICE DEPENDENT COORDINATION POLICY FOR DETERIORATING ITEMS WITH REVENUE SHARING ON PRESERVATION TECHNOLOGY INVESTMENT

A.R. Nigwal and U.K. Khedlekar

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[2]Department of Mathematics and Statistics, Dr. Harisingh Gour Vishwavidyalaya, Sagar (M.P), India (A Central University)

Abstract: Study develops a two-layer supply chain inventory model for deteriorating seasonal products, in which single manufacturer and single retailer are supply chain members. Deterioration reduces the profit of manufacturer as well as profit of retailer; therefore, manufacturer and retailer both are invest on preservation technology under revenue sharing contract. For this we developed an integrated two-layer continuous supply chain inventory model considering retail price dependent market demand of deteriorating seasonal products. We have optimized the retail price, initial lot size and replenishment cycle, when preservation technology is applied to reduce deterioration rate. Model is illustrated by numerically and also verified by analytically.

Keywords: Deteriorating product, Two-layer supply chain, Retail price, Revenue sharing.

AN EMPIRICAL STUDY OF ARIMA AND GARCH MODEL IN DAIRY PRICE FORECASTING

Radhika A and K Srividhya

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Abstract: The present study deals with the time series models to forecast the monthly dairy price indices. The Box Jenkins Autoregressive integrated moving average (ARIMA) and Generalized autoregressive conditional heteroscedasticity (GARCH) models were applied for forecasting and modelling the dairy price indices. Sequence charts test is used for testing the stationary of the series. ARIMA model cannot capture the volatility present in the data set whereas GARCH model has successfully captured the volatility. The error values of Root Mean square error (RMSE), Mean absolute error (MAE) and Mean absolute percentage error (MAPE) were also computed, BIC values of GARCH (2,2) model was smaller than that of ARIMA (1,0,1) model in that sense the GARCH (2,2) model was found to be a better model than ARIMA (1,0,1) model in forecasting dairy price index. Therefore, it shows that GARCH model was a better model than ARIMA model for estimating dairy price.

Keywords: ARIMA model, Forecasting, GARCH model, dairy Price index, Stationary, Sequence chart test.

DESIGNING ZERO ACCEPTANCE NUMBER SAMPLING PLAN WITH INSPECTION ERROR UNDER THE CONDITIONS OF ZERO – INFLATED POISSON DISTRIBUTION

K. Shalini, A. Sheik Abdullah and R. Hemalatha
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Abstract: In the current world of continually increasing global competition the main objective of the manufacturing and service organization include improving the quality of their production. Production process are well designed and monitored hence the occurrence of non-conformities is a rare event. A suitable model for this situation is a zero-inflated Poisson distribution. While testing a unit of inspection for its conformance, inspection errors are caused. This paper aims in designing zero acceptance number single sampling plan with inspection errors based on zero – inflated Poisson distribution.

Keywords: Process control, acceptance sampling, Sampling inspection by attributes, Single sampling plan, inspection error, Zero – inflated Poisson distribution

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COMMON FIXED-POINT THEOREMS IN DIGITAL METRIC SPACE USING IMPLICIT RELATION

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Abstract: The aim of the present paper is to prove a generalization of the Banach contraction principle in digital metric space. Also, a common fixed - point theorem for a class Φ and φ- contractive type mapping is proved. Further a common fixed - point theorem using implicit relation of integral type in digital metric space has been proved. An example and an application for image processing in digital metric space is also given in our support.

REDUCTION OF DIMENSIONALITY USING BAYESIAN APPROACH FOR SECOND ORDER RESPONSE SURFACE DESIGN MODEL

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Abstract: This paper provides the selection of best model for a second order response surface design in Bayesian approach. The posterior distribution of parameters obtained is presented and the method is illustrated with suitable examples under with and without restrictions on the moment matrix towards the orthogonality and rotatability. A comparison with classical methods is also presented.

Keywords: Dimensionality Reduction, Second Order Response Surface Design and Bayesian Approach.

MODELING PHYSICO-CHEMICAL PROPERTIES OF BENZENOID HYDROCARBONS USING TOPOLOGICAL INDICES OF MOLECULAR GRAPHS

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Abstract: Predictive potential of Randić index, Sum-connectivity index and Harmonic index is studied using QSPR models. These topological indices are used as parameters in the prediction of molecular weight (in g/mol), density (in g/cm^3), boiling point (in ℃) and melting point (in ℃) of Benzenoid hydrocarbons. It is shown that these indices are good predictors of the molecular weight (in g/mol) and boiling point (in ℃). However they are not sufficient to predict melting point (in ℃) and density (in g/cm^3)when used alone. Usefulness of additional information about the molecular structure of Benzenoid hydrocarbons in improving the performance of the molecular descriptors as predictors is also discussed.

Keywords: Randic index; Harmonic index; Sum-connectivity Index; Benzenoid hydrocarbons; Correlation; Regression.

A NEW MODIFIED RIDGE REGRESSION ESTIMATOR

Satish Bhat

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Abstract: Ordinary least squares estimator (OLS) estimator will yield unstable estimates when there is multicollinearity in the data. Thus in order to overcome the problem of multicollinearity, we propose a new modified ridge estimator to the ridge parameter. Performance of the proposed estimator is compared through mean squared error (MSE) with some of the existing ridge estimators which are defined in the literature. Simulation study is used to compare MSEs of the suggested and the other estimators. Results indicate that the suggested estimator performs better than the OLS estimator and the other existing estimators.

Keywords: Regression, Multicollinearity, Ridge parameter, MSE.

EVALUATING TECHNICAL EFFCIENCY OF PHARMACEUTICAL INDUSTRIES IN INDIA - DEA APPROACH

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Miriam Kalpana Simon, Assistant Professor, Department of Statistics, Madras Christian College, Chennai, Tamil Nadu, India

Abstract: In this study, we measure technical efficiency of Indian states in pharmaceutical industry using Data Envelopment Analysis (DEA). This approach involves evaluating the efficiencies of similar type of organizations, referred to as decision making units (DMUs) based on the inputs and outputs associated with the DMU's. Industries, banks, educational institutions, etc., are few examples of DMUs. This technique helps in assessing organization's relative efficiency, identify the top performance and also identify ways to improve their performance. India holds an important position in the global pharmaceuticals sector and is known as pharmacy of the world and biggest generic supplier. With a great wealth of scientists and engineers there is potential to steer the industry ahead to greater heights. India gained its foothold on the global scene with its innovatively engineered generic drugs and active pharmaceutical ingredients. In this paper, pharmaceutical industries in 24 states in India are considered as DMUs with each DMU having five inputs, namely, number of factories, working capital, fuels consumed, materials consumed and total inputs and three outputs, which are, total output, net value added and profit. Basic models of DEA namely Charnes, Cooper and Rhodes model (CCR) and Banker, Charnes and Cooper model (BCC) have been applied. It is identified that five DMUs are efficient under CCR and 10 DMUs are efficient under BCC models.

Keywords: DEA, technical efficiency, decision making units, CCR model, BCC model.

ROBUST CONTROL CHART BASED ON MEDIAN ABSOLUTE DEVIATION

R. Hemalatha, K. Shalini and I. Chandralekha
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Abstract: Statistical process control is commonly used tool in improving product quality through the achievement of process stability and capability. Control charts are proven tools to depict the improving quality in graphical pattern. When the underlying normality assumption is not met, the robust methods are one of the most commonly used statistical methods. In this paper, the control limit for the Shewhart (1931) $\bar{X}$ and S control chart based on Median Absolute Deviation are modified using the concept of three sigma (3σ) limits. A numerical example is illustrated to assess the performance of the proposed method and compare it with that of Shewhart method.

Keywords: *Process control, Control chart, Control limit Interval, Median absolute deviation, Average Run Length.*

A CLASS OF NONPARAMETRIC TESTS FOR SPECIAL TWO SAMPLE LOCATION PROBLEM BASED ON U-STATISTICS

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Abstract: One of the well-attended problems in nonparametric inference is the problem of testing for location in two -sample set up, known as two sample location problem. A class of distribution-free test statistics is proposed which based on U-statistics with its kernel depending on subsample median and subsample maxima, for special type of location problem under the assumption that underlying distributions are symmetric about zero. The performance of members of the proposed class is evaluated in terms of Pitman asymptotic relative efficiency (ARE) in comparison with Shetty and Umarani (2005). It is observed that the proposed class of statistics is better in comparison with the existing tests when the underlined distributions are symmetric.

Key words: Asymptotic relative efficiency, Subsample extremes, two-sample location problem, U-statistics.

A COMPARATIVE STUDY ON SPLIT PLOT AND MIXED FACTORIAL DESIGN IN THE YIELD OF OKRA

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Abstract: An experimental study was conducted in the Madras Christian College farm between January 2019 and March 2019 to evaluate the impact of fertilizers and cultivation methods on the Okra crop yield using Split Plot and Mixed Factorial design. For the purpose of the study, vermicompost and then a mixture of vermicompost along with synthetic fertilizer was used as the fertilizer variants. Mulching sheet, Grow bag and Flat bed were used as the cultivation methods. The experiment was replicated thrice for both the designs. Pre-harvest and multiple post-harvest readings were recorded. During the Pre-harvest study, number of leaves, height of the plant and the number of pods were considered whereas in the Post-harvest study weight of the pod, length of the pod and number of pods were recorded. Analysis of variance was carried out for both the designs using R programming. The results show that in both the designs, application of vermicompost produced better yield compared to synthetic fertilizer. Further it is also evident that using mulching sheet as a cultivation method produced significant yield than the conventional method. Interaction of fertilizer and cultivation method was found to be significant
in mixed factorial design alone.

Key words: okra, Fertilizer, Cultivation method, Split Plot design, Mixed Factorial design

ROLE OF INFORMATION TECHNOLOGY IN ENERGY HEALING (EH) TECHNIQUES: - A FRAMEWORK ANALYSIS

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Background:

Human body behaves like a rechargeable battery which utilizes the energy readily available in the earth and the entire universe for recharging itself. The mother earth and the entire universe help and provide us everything needed for the spiritual, mental and bodily healing. Besides human beings have a constant flow of energy from the feet to the minds. The Energy Healing Techniques believe that this flow of energy can heal the body by itself in a natural way. The paradigm shifts from the traditional medicine system which reveals us about the meridian system and the energy chakra vortexes to the modern science all tell us about energy system and be indebted to the basic principle that every substance is produced of energy. Medical practitioners of the modern age have recognized the benefits of energy healing and have started implementing it as one of the supplements to the modern medical treatment

Objective:

Many energy healing therapies, such as Traditional Eastern Asian Techniques which include techniques such as Reiki and qigong, Professional Traditions practiced in the West which is often practiced by nurses like Therapeutic Touch and Healing Touch, Eastern European bioenergy traditions have already been reviewed in the literature but the usage and impact of information technology has received very little information on energy healing techniques. This review provides light into the various energy healing techniques, its global impact and how Information Technology is involved in the various techniques.

Methods:

Energy healing techniques and the use of computers and other information technology in the therapeutic modalities were identified and analyzed using databases from different source. Information was extracted from books, journals, website and criteria for evaluation of quality of reporting. This review summarizes and critically evaluates various energy healing technique and use of computers and information technology as device used in energy healing.

Conclusion:

Since this qualitative framework analysis showed that most of these therapies do not have any side effects are to be proven scientifically with computerized imaging and software analysis is needed in order to support this energy healing techniques.

Keywords: Energy healing, Energy healing technique, role of information technology.

THE CHALLENGES OF THE HUMAN LIFE DURING COVID-19

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Abstract: This paper intends to study about the "THE IMPACT OF COVID-19" in India. Everybody in the world is directly or indirectly facing the severe consequences of this disease. The use of this research is to analyze the impact of the Covid-19 in the life of an individual. The study is based on descriptive in nature which considered 365 Samples selected from 1,00,000 Population in Vaniyambadi Taluk, Tirupathur District. This paper analyzes the economic status and problem faced in people after COVID 19. Finally, after analyzed the data, that COVID 19 is a global crisis and the biggest challenge have faced in our regular life time.

Keywords: COVID-19

TIME SERIES MODELING FOR WORLD POVERTY LEVEL

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***Abstract*:** Forecasting is a complex issue to predict the future trend of uncertain situations. It plays an important role in our daily life and many organization and individuals use forecasting to manage, assist, and plan their programs, budgets and investments. Time series analysis is an important research concept which is used in many fields to forecast the future values. In time series analysis, ARIMA (Autoregressive Integrated Moving Average) model is one of the most familiar forecasting techniques. The main objective of this research article is to develop the ARIMA model for the world poverty level time series data and also forecast the future values using the developed ARIMA model.

Key words: Poverty level, Stationarity, Autocorrelation function, Partial autocorrelation function, Forecasting, ARIMA Model.

ANALYSIS OF THE ECONOMIC IMPACT OFCOVID-19

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Abstract: The sudden occurrence of COVID-19 is the major event tnat happened in 2020, till yet. The COVID-19 fIoyvs as a pandemic and affected millions of lives, along with the business operations in the global market. There has been decelerating in all econom ic sectors worldwide and more than one third of tne global population was placed under lockdown. In this paper, analyze the economic impact of COVID-19 on the following sectors. Before COVID-19 industries were going smoothly and during COVID-19 most of industries were affected very badly in their profits. We assess and compare the profits of industries with before and during pandemic periods. This paper analyzes the economic data from each industry and graphically represents the losses in the industry as a result of C0VID-19 pandemic. This research work will give readers a clear understanding of the effect of C0VID-19 pandemic has created a widespread economic brake and lfas affected different sectofs of the economy.

Keywords: COVID-19, economic brake, industry, sector

BAYESIAN ESTIMATION OF STRESS-STRENGTH RELIABILITY FOR TYPE- II GENERALIZED LOG-LOGISTIC DISTRIBUTION

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Abstract: The paper demonstrates the estimation of stress-strength reliability, when the stress and strength variables follow type-II generalized log-logistic distribution. Estimators of reliability are obtained through different methods of estimation like maximum likelihood estimation and Bayesian estimation. Tierney – Kadane approximation technique is used to obtain Bayes estimators under different loss functions and priors. Asymptotic confidence interval of reliability is constructed. The analysis of real data is conducted to illustrate the methods developed here.

Key words: Type-II generalized log-logistic distribution, Reliability, maximum likelihood estimation, Bayes estimation, Tierney-Kadane approximation.

A TEST FOR COMPARING TWO POPULATIONS HAVING MORE INCREASING FAILURE RATE AVERAGE PROPERTY

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Abstract: In this paper, a test based on U-statistic for comparing two distributions possessing 'more increasing failure rate (IFRA)-ness' property of life distributions is proposed. The proposed test procedure rejects the hypothesis of one has more IFRA ness property than the other for large values of the statistic proposed. The distributional properties of the proposed test statistic are studied. The asymptotic relative efficiencies(ARE) of the proposed procedure are evaluated with respect to the tests available in the literature for this problem. It is observed that the members of proposed class perform well.

Key Words and Phrases: Increasing failure rate average, Two-sample test, Pitman ARE, U-statistic.

IMPACT OF POPULATION DENSITY ON COVID-19 INFECTED AND MORTALITY RATE IN KARNATAKA

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Abstract: The Covid-19 is a highly infectious illness that is becoming a serious public health issue. Residents living in high-density environments, such as urban or metropolitan cities, are more likely to come into direct contact with others, and any infectious illness is also expected to spread rapidly in populated areas. Here, in the sense of Karnataka, we are investigating the effect of the population density on Covid-19 spread and associated mortality. We observed a mild relationship between Covid-19 spread and the population density following a thorough correlation and regression analyses of an infection and death rates related to Covid-19 on a district level.

Keywords: Covid-19, Infection and mortality rate, Population density, Karnataka.

DETERMINATION OF RELIABILITY SINGLE SAMPLING PLANS BASED ON EXPONENTIATED RAYLEIGH DISTRIBUTION

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Abstract: Acceptance sampling plans are the statistical tools used in industries for taking decision about disposition of lots of incoming and/or outgoing finished products. When lifetime is the quality characteristic of the products, sampling inspection is carried out based on reliability sampling plans by conducting suitable life test. Time and cost of conducting the life test may be high in some cases. In such situations, censoring schemes may be employed. Among various censoring schemes, hybrid censoring scheme is applied with an objective of saving both time and cost of inspecting the products simultaneously. Parameters of reliability sampling plans are determined corresponding to the lifetime distribution of the products. Exponentiated Rayleigh distribution is a statistical distribution obtained introducing a new parameter in the exponent of the cumulative distribution function of the Rayleigh distribution, which has applications in reliability and life testing. This paper attempts to construct reliability single sampling plans under hybrid censoring scheme assuming that the life time of the product follows exponentiated Rayleigh distribution. Plan parameters are obtained corresponding to two specified points on the operating characteristic curve. Selection of the plan parameters is illustrated with a numerical example.

Keywords: Quality control; Reliability sampling plan; hybrid censoring; Exponentiated Rayleigh distribution; operating characteristic function.

MOMENT OF PARETO-RAYLEIGH DISTRIBUTION THROUGH GENERALIZED ORDER STATISTICS

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Abstract: In this paper, we derive the explicit expressions for single and product moment of generalized order statistics for the both cases $\gamma_i \neq \gamma_j$ and $\gamma_i = \gamma_j$ ($m_1 = m_2 = \cdots = m_{n-1} = m$) from Pareto-Rayleigh distribution using hypergeometric function and some concluding remarks are discussed.

Keywords: Generalized order statistics , Pareto-Rayleigh distribution, Single moment, product moment, order statistics, hypergeometric function.

AMS Subject Classification: (2010) 62G30, 33C90

CALCULATION OF OPTIMUM PREMIUM VALUES

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Abstract: In the present paper we optimize the maximum premium values using Hamiltonian-Jacobi-Bellaman (HJB) equation. Here we consider quadratic and fractional power utility functions for different loss distributions of discrete analogues of continuous distributions. We find that the quadratic utility function is more beneficial to the insured and fractional power utility function is more beneficial to insurer. We give numerical illustrations for discrete analogues of continuous distributions using these two utility functions.

PROGNOSIS OF CANCER - A SEMI MARKOV PROCESS

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Abstract: The process of carcinogenesis was classified into six states. The transitional states and absorbing states are well defined. Since all the patients under study do not reach the last state at a given point of time, the process was studied as a Semi Markov Process. Maximum likelihood estimation of the transitional probabilities, the survival function, the Hazard function and the waiting time distribution of patients in different states were obtained.

A STOCHASTIC MODELS FOR EXPECTED TIME IN COVID-19 USING EXPONENTIAL DISTRIBUTION

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Abstract: The epic Coronavirus (COVID-19) is spreading and has caused a huge scope disease in China since December 2019. This has prompted a significant sway on the lives and economy in China and different nations. Here we build up a discrete-time stochastic plague model with binomial appropriations to examine the transmission of the sickness. The appraisals of the contact rate and the effective conceptive number help the efficiency of the control quantifies that have been executed up until now. The effect of the circumstance of getting back to work is additionally assessed on the illness transmission invigorated different of insurance and control measures.

Keywords: COVID-19; stochastic model; Inter-contact times; Seroconversion

STATISTICAL EVALUATION OF THE STRESS LEVELS AMONG THE WORKING WOMEN IN THE TEACHING PROFESSION

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Abstract: Women excel in the education and are keen enough to build their own career. Work builds up confidence, financial independence and individual identity. **By overcoming the societal barriers and gender inequality, women are growing and shining in various sectors of workspace, as a maid in a house to ruling a country in the ministry of cabinet.**

Women can prove themselves over men due to a unique caliber of multitasking they possess. Among the different professions, women preferably choose the noble profession of teaching as it is safe, dignified and have scope to mentor students with their motherly nature. As the saying goes "**educating a woman is educating a nation**", the urge for women to pursue higher education qualifies them to the professor job in educational institutes.

The present day educational institutes emphasis on research and administrative capabilities of its employees along with teaching. Failure to meet up the personal demands and professional deadlines, balancing between personal and professional life are posing stressful implications among women in many instances.

Stress builds up when they are overloaded and are struggling to cope to meet the expectations. The body starts reacts and responds to this situation. A prolonged stressful condition seem to compromise the immune system, worsen the health condition and elevates the obesity, heart diseases, Alzheimer's disease, diabetes, hypertension and gastrointestinal problems. Hence the present survey was taken to evaluate the stress levels in the women in the teaching profession.

100 working women were subjected to the study and their stress levels were statistically evaluated in terms of their personal, teaching and research priorities. This study concluded that married women showed higher levels of stress compared to the unmarried category which implies the support and encouragement from the family is equally important for women to set her mind free and explore in the field of her career interest.

STATISTICAL INFERENCE OF RELIABILITY IN MULTI-COMPONENT STRESS STRENGTH MODEL FOR PARETO DISTRIBUTION BASED ON UPPER RECORD VALUES

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Abstract: In this article, inferences about the multi-component stress strength reliability are drawn under the assumption that strength and stress follow independent Pareto distribution with different shapes (α_1, α_2) and common scale parameter θ under the setup of upper record values. The maximum likelihood estimation, Bayes estimator under squared error and Linear exponential loss function, of multi-component stress-strength reliability are constructed with corresponding highest posterior density interval for unknown θ. For known θ, uniformly minimum variance unbiased estimator and asymptotic distribution of multi-component stress strength reliability with asymptotic confidence interval is discussed. A simulation study is conducted to numerically compare the performances of various estimators of multi-component stress-strength reliability. Finally, a real life example is presented to show the applications of derived results in real life scenarios.

A STATISTICAL ANALYSIS FOR THE DIFFERENCE BETWEEN TWO PROPORTIONS USING FUZZY PROBABILISTIC APPROACH

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Abstract: The Proportions testing of hypothesis plays an important role in test of significance and to test the result of an experiment. The statistical tests were used to observe the experiment is statistically significant or not. In real time situations, deal with vague or imprecise data. To overcome this problem, fuzzy probabilistic approach were utilized. In this paper, the statistical analysis for the difference between two proportions using fuzzy probabilistic approach is constructed with a numerical illustration.

Keywords: *Test of Significance, Population Proportion, Trapezoidal Fuzzy Numbers.*

EFFECTIVENESS OF PSYCHOLOGICAL CONTRACT AMONG WOMEN EMPLOYEES– A STUDY WITH REFERENCE TO PUBLIC SECTOR BANK IN CHENNAI

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Abstract: This study is an attempt to provide the subjective experience of the employment relationship from various frames of reference Employee obligation, Employer obligation through psychological contract. The present study was Descriptive Nature and conducted among employees and managers working in leading public sector banks. Data for this study were collected from 159 (Women Employees) and 38(Women Manager's) working in Public sector banks. The convenient sampling was adopted to collect the data. Data were collected in leading public sector banks through structured questionnaires in selected metro branches at Chennai. Statistical tools were used to analyze the data. Statistical tools were used to analyze the data. Frequencies have been used to measure the personal and organizational details. Independent sample t test, Discriminant analysis and ANOVA were used to analyse the data as per the objective. In this research it is seen that if an employer and employee are able to satisfy each other basis the expectation set it builds a better working environment and thereby improves relationship.

QUALITY ATTRIBUTES EVALUATION USING CONSUMERS DEMOGRAPHIC FACTORS

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Abstract: There are many instruments like E-Nose, E-Tongues, Spectrophotometers, Colorimeters, Chromatography, Food Texture Analyzer and Digital image processing enable quality evaluation of the food products by objectively. There are the valuable tools to measure for ensuring consistent of quality of foods. However, food is eaten every time the quality of food is judged. The reaction on the basis of quality sensory evaluation is inevitable even the foods have enough required quality of attributes. Also food provides the suitable nutrition. The computation method illustrates generally a good quality consumer acceptance measures of attributes on food products.

Keywords: Fuzzy set, Hedonic Scale, Power Law, Relative Growth Rate, Association of Attributes, Coefficient of Colligation.

FOCUS ON THE EDUCATIONAL CHALLENGES DURING COVID-19

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Abstract: In the modern Technology world Education is one of the important profession. Especially in the pandemic period of Covid-19 it is necessary to explore digital learning.In the pandemic situation affect the global education system. Institutions and educators are unexpectly accept the remote teaching. This research paper involves the faculty and students physical and mental pressure in during the pandemic year of the online class. The Communication between faculty and students are less due to Digital and Distance learning. This work highlighted that online learning is affected between teachers and students about the technology,environment, family,study purpose, internet problem etc…Datas are collected from faculties and students from the Virudhunagar district. The data are analyzed and conclude that Covid-19 has the effects on digital education learning process between teachers and students.

Keywords: Education,Faculty,Students

ASYMPTOTIC NORMALITY OF THE ESTIMATORS OF THE PARAMETERS IN PERTURBED WEIBULL MODEL

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Abstract: The maximum likelihood estimators of the parameters are obtained through EM algorithm in perturbed Weibull model. A simulation study has been carried out to demonstrate the asymptotic normality of the estimators of the parameters in perturbed Weibull model through three-dimensional graph using R software (maxLik/optim).

Key wards: Maximum likelihood estimator, EM algorithm, Bivariate normal distribution,

STOCHASTIC MODELLING FOR IDENTIFYING MALIGNANT DISEASES

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Abstract: The TP53 (tumour suppressor) gene grants instructions to make tumour protein which regulates cell division in a prescribed manner. If any changes occur in its structure or function, the cell division results in either malignant cell growth or benign. Malignant cell growth will cause several types of cancers (Tommasino *et al.*, 2003). In this paper, a model for mutated genes have been developed, which will be very helpful to detect whether the embedded gene is mutated or not. If it is identified earlier, initiatives can be taken to reduce the malignancy of the disease in advance. Hidden Markov Models are the widely used stochastic model to analyse biological sequences (Yoon *et al.*, 2009). Profile Hidden Markov Model generates a profile of gene sequence with emission and transition probabilities (Eddy *et al.,* 1998). Jumping Profile Hidden Markov Model used to compare the single gene against a multiple sequence alignment or Profile (Schultz *et al.,* 2012). Modelling the mutated genes and comparing the new gene with them will become a cost-effective primary prevention method from various chronic diseases and resilience to drugs.

Keywords: *Gene Mutation, Genomics, Hidden Markov Model, Jumping PHMM, Malignant cell growth, Multiple Sequence Alignment, Profile HMM.*

IMAGE PROCESSING TECHNIQUE USING SURF POINTS IN IDENTIFYING MEDICINAL LEAVES

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Abstract: Digital image processing is currently being utilized in various domains; in this paper, effort has been put forth for identification of medicinal plants by implementing image processing maneuvers. The study concentrates on identifying the plants using its leaf veins. Sequence of algorithms were tried for the foliage identification. Speeded Up Robust Feature (SURF) extraction is utilized to designate and distinguish the localized topographies of the predictable foliage vein image. In addition to that, Support Vector Machine (SVM) was cohesive to categorize and recognize the exact herb. The outcomes exhibited precision percentage of 93 whereas the error percentage was 7.

Keywords: digital image processing, herb, foliage, leaf vein, Speeded Up Robust Feature (SURF), Support Vector Machine (SVM).

NOTE ON THE CHARACTERIZATION OF ZERO-INFLATED CHI-SQUARE DISTRIBUTION

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Abstract: Probability distributions are useful to model random phenomena. New random experiments are conducted and novel data sets are encountered. In turn, new distributions emerge. Zero-inflated discrete and zero-inflated continuous distributions are such cases. They have found many applications in the recent past. Characterization of a distribution is studying a unique property enjoyed by it. A probability distribution can be characterized through various methods. Zero-inflated discrete distributions are characterized through differential equation [see Nanjundan and Sadiq Pasha (2018)]. In this paper, zero-inflated chi-square distribution is characterized via a differential equation satisfied by its moment generating function.

Key words: Zero-inflated continuous distributions, moment generating function, linear differential equation.

COMPARATIVE STUDY OF WOMEN SELF EMPLOYED IN BEAUTY PARLOUR ENTREPRENEURS AND UNEMPLOYED WOMEN IN BUTWAL, NEPAL

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Abstract: The present research is undertaken for investigating comparison between women self employed in beauty parlour entrepreneurs unemployed in Butwal sub-metropolitan city of Rupandehi district of Nepal with the objectives to the identify and assess the factors that cause to distinguish between self employed women unemployed ones in the study area. The survey was carried out to obtain information from a sample of 50 beauty Parlours and 50 unemployed women in the study area. Econometric tools (Probit Model) as well as tools of descriptive statistics were applied for getting the result. The study reveals that probability of a woman of being BPE decreases with increase in the level of education, married women and having sufficient time for entertainment but probability of a woman of being BPE increases with increase in size of family, getting family help, economic empowerment and realizing less difficulty as being a female. In the sample of 50-50 of BPE/non BPE, mean age of BPEs and non BPEs significantly differ and mean age of BP is more than that of non BPEs (one tail test). However, mean education level, size of family, number of children, spouse education, decision making right (5-point on Likert Scale), family help (5-point on Likert Scale), level of difficulty being women (5-point on Likert Scale), differ between BPE and non BPE of but the difference is not statistically significant. Satisfaction of women was measured on three-point scale, 1 implying not satisfied, 2-satisfied and 3-well satisfied in life. Again, mean satisfaction level differs between BPE and non BPE of but the difference is not statistically significant. The level of difficulty occurred after marriage (MD) of women was measured on 5-point Likert scale, 1 implying very low to 5 very high in life. Mean difficulty level differs between BPE and non BPE of and the difference is statistically significant. This implies that BPE are facing more difficulty after marriage, which seems logical because mostly women have to shoulder outside duty as well as household chores. The level of husband's help was measured on 5-point Likert scale, 1 implying very low to 5 very high in life. Mean help level differs between BPE and non BPE of and the difference is statistically significant. This implies that non BPE are receiving more help from husband after marriage, which seems logical because mostly man, in this case, gets more time to spend with their wife. Mean entertainment level differs between BPE and non BPE of and the difference is statistically significant. This implies that non BPE are receiving more time for entertainment.

Key Words: Employment, Beauty Parlour, education, decision, satisfaction, empowerment

STATISTICAL MODELLING OF COVID – 19 EPIDEMIC IN INDIA

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Abstract: Statistical analyses of data from studies of COVID – 19 transmissions in people of infected individuals often focus on estimation of per infectious probability of virus transmission, or infectivity. We used COVID - 19 surveillance data to model the situation for the zones. Estimation and inference are complicated by limitations in infected study data, which may include unknown time of infection for either or both persons and inaccurate or incomplete information on the number and frequency of infected persons. The necessary statistical methodology requires analysis of binary regression models with complementary log- log links, where components of the regression function are subject to illustrated on data sets from studies of COVID -19 transmissions.

Key Words: COVID – 19, Stochastic Modelling, generalized linear regression, infected persons.

BAYESIAN SURVIVAL ANALYSIS OF ACUTE ENCEPHALITIS SYNDROME WITH CENSORING MECHANISM USING BRMS PACKAGE

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Abstract: Acute encephalitis syndrome(AES) most commonly affects children and young adults and can lead to considerable morbidity and mortality. In June 2019, the outbreak of acute encephalitis syndrome occurred in Muzaffarpur district and their neighbouring district of Bihar. This paper presents the Bayesian survival analysis of AES data of the Muzaffarpur district. AES data extracted from the SKMCH and KM hospital of Muzaffarpur. The Weibull, Log-normal, and Exponential, these survival models have been used for fitting of AES data with the help of brms packages of R and compared these models with the Leave one out cross-validation. brms package uses the Hamiltonian Monte Carlo(HMC) sampler and its extension, no-U-turn sampler (NUTS) algorithm of MCMC, for the simulation study. In addition, the Logistic regression model is used to predict the risk of death on the basis of observed characteristics or covariates.

Keywords: Acute Encephalitis syndrome data, Bayesian Inference, Survival models, brms package, Leave one out cross validation.

ON SELECTING BEST NEW BETTER THAN USED OF SPECIFIED AGE DISTRIBUTION

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Abstract: The present study considers the problem of selecting the 'Best' population among the several populations which belong to new better than used of age t_0 (NBU-t_0) class of life distributions. The selection procedure is based on a measure of departure from exponentiality towards NBU-t_0 due to Hollander, Park and Proschan (1986). Hollander, Park and Proschan (1986) proposed a test procedure based on U-statistics to test exponentiality against NBU-t_0 which is an estimate of measure proposed. The selection procedure is based on large sample properties of the statistic and the performance of the selection procedure proposed here is evaluated in terms of probability of correct selection (PS).

Keywords and Phrases: New Better Than used of age t_0 (NBU- t_0) class, Selection and ranking, U-statistic, Probability of correct selection.

THE INFLUENCE OF AN ADDITIVE OUTLIER ON THE VARIANCE OF MA(1) MODEL

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Abstract: In this work, the effect of an Additive Outlier (AO) on the variance the residuals and series of a Moving Average model of order 1, (MA(1)), is algebraically derived. The obtained expressions are split (partitioned) in such a manner that one can see the contribution of an AO to the variance of the residuals and also to that of the series. Through simulation study the

contamination due to the outlier AO in the variance of the series is obtained for the model. This analysis reveals that the magnitude and the sign of the parameter of the underlying model influences the variance of the residuals and the series. This fact is vital while drawing inferences from a time series data, which is contaminated by an AO.

Keywords: Variance, Residuals, Moving average, Additive Outlier, Simulation Study

RATIO ESTIMATOR USING A NEW LINEAR COMBINATION & ITS COMPARISON

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Abstract: We propose a new modified ratio estimator of population mean of the main variable using the linear combination of known values of Co-efficient of Kurtosis and Tri-Mean of the auxiliary variable. Mean Square Error (MSE) and bias of the proposed estimator is calculated and compared with Yan & Tian (2010) estimator. The comparison is demonstrated academically and practically and the conclusion is that proposed estimator is efficient one under various conditions.

Keywords: Estimator, Simple random sampling, Auxiliary variable, Mean square error, Bias, Co-Efficient of Kurtosis, Tri-Mean.

A STUDY ON FACTOR ANALYTIC APPROACH ON ACHIEVEMENT

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Abstract: The first conception of mental ability is that comes from faculty psychologists as having a limited no of distinct and unitary powers. It implied that a memory test measured memory and nothing else and vocabulary test measured the strength of vocabulary and nothing else. The major statistical goal in a factor analysis is to substitute a factor matrix for the correlation matrix. Here in the present study the centroid method of Thurstone was adopted. Results highlighted that c ommunalities are higher in intelligence, interest and achievement and are relatively low in aptitude and socioeconomic status. The extraction of first centroid factors were done by method of Thurstone and interpretation were done accordingly.

Key words: Factor analysis, Thurstone, achievement.

BAYESIAN MODELING OF VAR MODEL WITH MULTIPLE COVARIATES

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Abstract: This paper aims to provide a comprehensive overview of the Bayesian estimation methodology for the multiple covariate vector autoregressive (MC-VAR) model, in both methodology and application point of view. In that respect, conditional posterior distributions are derived to obtain the Bayesian estimators and influence based on covariate is analyzed by posterior odds ratio. Due to multiple integrations, the Gibbs sampler method is employed for the estimation of the MC-VAR model. Our approach is applied on both simulation and real data series to show the applicability of the proposed model. The real data result is useful for analyzing the relationship of covariates in economic time series.

Key words: Bayesian inference; Covariate; Vector autoregressive model.

ECONOMIC ORDER QUANTITY MODEL FOR PARALLEL CONVERTIBLE ITEMS

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Abstract: In this paper, we have developed an economic quantity model for parallel conversion of item. The initial form of item converts in two parallel items of different nature and demand, also their deterioration and prices are different. Two parallel conversions occurs at the same time, however conversion costs are differ. Total cost equation has been developed and optimized.

Keywords: Inventory, Parallel Convertible item, Conversion cost, Conversion time, Deterioration.

Subject Classification: 90 B 05.

MODELING AND POTENTIAL PROGNOSIS OF THE NUMBER OF CASES COVID-19 PANDEMIC WITH LINEAR, NONLINEAR REGRESSION MODELS AND ARTIFICIAL NEURAL NETWORK MODELS

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Abstract: Coronavirus disease 2019 (COVID-2019) has been identified as a global threat, and many experiments are being performed using various mathematical models to forecast this epidemic's possible evolution. Many of the biggest wealth Economies are stressed because this disease is highly contagious and transmissible. Because of the rise in number of cases and their resulting burden on the government and health care practitioners, some predictive methods for predicting the number of cases in the future will be needed. We evaluated the performance of the linear, non-linear regression and artificial neural network models to forecast the cases reported daily COVID-19 in India 60 days ahead, and the impact of preventive measures such as social isolation, wearing mask and lockdown on COVID-19 spread. Predicting different parameters (number of positive cases, number of cases reported, number of deaths)

Keywords: COVID-19, linear and non-linear regression models, artificial neural network model, R^2, RMSE, MSE and MAE.

VIRTUAL LEARNING: PROSPECT OF EDUCATION AS A PANACEA IN THE PHASE OF COVID PANDEMIC

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Abstract

The petrifying and the extreme impact of COVID-19 has shaken the world to its core. The COVID-19 pandemic has caused the biggest interruption in the history of education systems, affecting almost 1.6 billion learners in more than 190 countries on all continents. India is experiencing an e-learning boom in the aftermath of the COVID-19 crisis. This article reflects the feasibility of virtual learning in the higher education system during the COVID pandemic, to explore the different variables that positively and skeptically affects students in virtual learning, and to inspect the impact of virtual learning on student's contentment. Primary data has been collected from 605 students who were regular students of various programs attending offline classes in their respective institutions. A pilot test was implemented, the survey items were checked for validity and reliability. Data analysis was performed using paired t-test, exploratory factor analysis, and logistic regression. To probe if the students were happy about online learning, a comparative analysis is carried out using paired t-test, and to find the influence of these factors on student satisfaction, logistic regression is carried out. Because of the quality of education, engagement and maintaining of social relationships, and participation in co-curricular activities, this study indicated that students are more satisfied with the physical classes. The above elements of the virtual education framework need to be changed or modified, which would lead to an improvement in the level of contentment of students with virtual learning.

Keywords: Virtual Learning, Education System, Covid Pandemic, Exploratory Factor Analysis, Logistic Regression