

## CURRICULLUM VITAE



### 1. PERSONAL DETAILS

Name : **DR. ISMAIL B**

Designation : **PROFESSOR**

Date of Birth : 10<sup>th</sup> April, 1957.

address for correspondence	Residential address
Professor & Chairman Department of PG Studies and Research in StatisticsMangaloreUniversity, Mangalagangothri Ph:0824-2287358 Email: prof.ismailb@gmail.com ismailbn@yahoo.com	#3-317, Nadupadavu, Montepadav Post, Kairangala Mangalore -574153, Karnataka Phone: 9448546006(M) 0824-2287517 (R)

### 2. QUALIFICATIONS :

- **Post-Doctoral Research:** Honorary Senior Research Fellow, Department of Statistics, University of Glasgow, Glasgow, Scotland U.K., 2000-2001.
- **Ph.D. in Statistics**, Mangalore University, 1993.  
Topic : Econometrics  
Thesis Title : Some Contributions to the Statistical Analysis of Stochastic Models in Econometrics.
- **M.Sc., Statistics (First Class)**, 1981. University of Mysore Manasagangothri.

### 3. FELLOWSHIP AND RECOGNITIONS :

- **Commonwealth Fellow 2000** awarded by the Association of Commonwealth Universities, U.K.
- **“Franca e Diego de Castro” Award (jointly with C T Jose) for the Research Paper “Estimation of Error Correlation in Nonparametric Regression” in honor of Diego de Castro, Torino, Italy, 2004.**

### 4. RESPONSIBILITIES :

- **Chairman**, Department of Post-Graduate studies and Research in Statistics, Mangalore University, Mangalagangothri during 2010-2012 and Jan 2016 till date.

- **Member, Academic Council** , Mangalore University.2013-15
- **Member**, Statute Committee, Mangalore University
- **Chairman**, PG-BOS and UG-BOS in Statistics Mangalore University
- **Custodian**, Central Valuation of Post Graduate examinations of Arts, Science and Education Faculties for December 2012 Examinations and May 2013 Examinations.
- **Nodal Officer**, Mangalore University for MHRD All India Survey on Higher Education since 2012 till date.
- **Coordinator**, OBC Cell of Mangalore University since 2006.
- **Chairman**, Mangalore University Annual Report preparation Committee for the years 2007-08, 2008-09, 2009-10, 2010-11, 2011-12 and 2012-13.
- **Editor** , Mangalore University News Letter for the period 2008-09 to till date.
- Member **IQAC** , Mangalore University.
- Member Promotion of University Research and Scientific Excellence (PURSE) program, Mangalore University since 2011-12 till date.
- Member of RUSA( Rashtriya Unnatha Shikshana Abhiyana) 2013-2015
- Member ,for the preparation of Re-accreditation report and self study report of the University for submission to NAAC .
- Worked as Statistical Officer to provide necessary information to the X<sup>th</sup> Plan and XI<sup>th</sup> Plan UGC expert committee during their visit to assess the IX<sup>th</sup> Plan and X<sup>th</sup> Plan progress and also assess the X<sup>th</sup> Plan and XI<sup>th</sup> Plan proposals of the University for the UGC grant.
- Member, for the committee to prepare Mangalore University Brochure.
- Member SC/ST standing committee, Mangalore University
- Member NSS standing committee, Mangalore University.
- Superintendent, UGC-NET examination, Mangalore University Centre.
- **President Vishwamangala Education Society, Mangalore University campus**, Mangalagangothri from July 2015 till date.
- **Secretary (2002-2005) Vishwamangala Education Society, Mangalore University campus**, Mangalagangothri
- **Treasurer( 1997-2000), Vishwamangala Education Society, Mangalore University campus**, Mangalagangothri

- **President** (during 2012, 2013, 2017), Mangalore University Teachers Association, Mangalagangothri.
- **Vice-President** (2009) and Secretary (2002), Mangalore University Teachers Association, Mangalagangothri.
- **Convener**, Mangalore University Silver Jubilee Exhibition Committee (Silver Jubilee year Sept.2004 to Sept.2005).
- Chairman, Local Inquiry Committee for Affiliation of Colleges to the University .
- Coordinator, Computer Awareness Programme organized training programme to the faculty members and students of various departments in the University campus.
- Inquiry Officer to make departmental inquiry on the charges framed against the employee of the University.
- Election Officer to the election of Mayor, Deputy Mayor and members of the standing committees (Based on principle of proportionate representation by means of the single transferable vote) to Mangalore City Corporation.

## 5. PROFESSIONAL ACTIVITIES

### (a) Teaching Experience: 33 years teaching Experience.

- Teaching in the Department of Statistics, Mangalore University since 6<sup>th</sup> October 1981 for M.Sc. , M.Phil. and Ph.D. Students. Involved in designing courses for M.Sc., M.Phil. and Ph.D.
- Taught Biostatistics to M.Sc. students of Bio Sciences, Applied Botany and Applied Zoology courses , Mangalore University for several years
- Probability and Statistics to M.Sc., Computer Science students for two years.
- Member P.G. Board of Studies in Statistics at University of Mysore, Bangalore University, Calicut University, Cochin University of Science and Technology and Mangalore University
- Worked as Examiner for Ph.D. Thesis evaluation of Mangalore University, Kerala University, Shivaji University Kolhapur, Calicut University, Kannur University, Mahatma Gandhi University and Acharya Nagarjuna University.

## 6. Research

### **Flexible Statistical Modeling:**

Worked on modeling discontinuous phenomenon. In the field of regression analysis significant contribution has been made on detecting discontinuities, estimation of jump size and testing for discontinuities. Developed improved methods for estimation and testing change points in regression curves and surfaces.

- Improved methods in terms of computation time and accuracy are developed for estimating discontinuities and jump size in regression curves and surfaces using non-parametric regression.
- Estimation of error variance in non-parametric regression model is developed.
- A global test for detecting the presence of discontinuities in a regression function is invented.
- Developed improved method of estimation in Econometric model with stochastic restrictions and multicollinearity problem.
- More than 20 research papers have been published in the area of non-parametric regression in leading journals such as journal of Non-parametric Statistics, Taylor and Francis (U.K.), Journal of Statistics and Computing, Springer, Netherlands, Statistical Methods, Journal of Indian Society of Agricultural Statistics, Journal of Communications in Statistics Theory and methods, Marcel Dekker, Journal of Data Sciences and Journal of Wavelet theory.
- One of the paper published in the Journal of Indian agricultural statistics, titled ‘Spatial Smoothing Technique in field experiments’ (Vol. 63 No.2 August 2009 p.p. 151-158), adjudged best paper published in the field of Designs of experiments by the society.
- Another research paper published during 1997 published in the Journal of Communication Statistics, Theory and Methods, has been referred in a text book published from Springer publication and other papers have many citations.
- Currently research work is being done in the area of application of wavelet methods in image analysis and also application of non-parametric regression methods to develop models and methods for the analysis of financial time series.

### **Publications in Journals/Proceedings/Edited Books : 30**

1. Harsha S and **Ismail B** (2016) “Improved Test For Detecting Explosive Bubbles”, Journal of Data Science. Vol.16 (3), pp 495-508.

2. Harsha S and **Ismail B** (2016) “Detecting Speculative Bubble: Power Comparison Of Unit Root Tests”, International Journal of Statistics and Systems. Vol. 12 (3), pp.499-507.
  
3. Harsha S and **Ismail B** (2016) “Duration Dependence Test to Detect Financial Bubble using Generalized Logistic Hazard Function”, International Journal of Finance and Quantitative Methods. Vol. 39 (1), pp 1103-1107.
  
4. **Ismail B** and Manjula Suvarna (2016) “Estimation of Linear Regression Model with Correlated Regressors in the Presence of Autocorrelation”. International Journal of Statistics and Applications. Vol. 6 (2), pp 35-39.
  
5. **Ismail B** and Manjula Anil(2014) “Regression methods for analyzing the risk factors for a life style disease among the young population of India’, Indian Heart Journal Vol.66, pp587-592, Elsevier publication.
  
6. **Ismail B** and Ashwini Kumari(2014): ‘Semiparametric estimation of Volatility’, International Journal of Mathematical Archive 5 (9), pp 65-72.
  
7. **Ismail B** and Vidya Bai G(2013) “Estimating Value at Risk in Financial Assets; A Parametric and Non-Parametric Approach”, International Journal of Mathematical Archive (IJMA), Vol.No.4, pp156-161, ISSN 2229-5046. (ICV 5.09)
  
8. Ataulla, **Ismail B**, Mohd.Yunus (2013) “An enhanced least square algorithm based spectral estimation with neural networks”. International Journal of Statistics and Systems.(ISSN 0973-2675) Volume 8, Number 1, pp.15-27)
  
9. Ataulla, **Ismail B**, Mohd.Yunus (2012) “Genetic algorithm and neural base enhanced least square algorithm for spectral estimation”. International Journal of Statistics and Analysis.(ISSN 2248-9959) Volume 2, Number 5 , pp. 509-525)
  
10. Vidya Bai G and **Ismail B** (2012) “Portfolio Analysis-Diversification Techniques; an Empirical Evaluation of Alternative Financial portfolio Models”, Global Journal of Management Science and Technology Vol.1 Issue 10. November 2012. (ISSN 2277-5978) (online))
  
11. **Ismail B** and Anjum Khan(2012): ‘Detection of Jump and Cusp using Harr Wavelets in regression function’ , Journal of Wavelet Theory and Applications(JWTA) Vol.6,No.1, 2012, pp 33-38.

12. **Ismail B** and Anjum Khan(2012): Image De-noising with stationary wavelet transform, *Journal of Wavelet Theory and Application*, Vol.5, No.1, pp9-14, January 2012.
13. **Ismail B.** and Anjum Khan(2012): ‘Image De-noising with a New Threshold Value using Wavelets’, *Journal of Data Science* Vol.10.No.2, pp259-270, April 2012.
14. Ataulla, **Ismail B**, Mohd.Yunus (2011)"Time series forecasting using un-decimated wavelets, neural networks and genetic algorithm". *International Journal of Electronics and Computer science engineering*. (ISSN 2277-1956/Volume 1, Number 3, pp. 1404-1415)
15. Jose C T., Ravi Bhat., **Ismail B** and Jayashekhar(2009): ‘Spatial Smoothing Techniques in field experiments’, *Journal of the Indian Society of Agricultural Statistics*, Vol.63(2), pp 151-157, ISSN-0019-6363
16. Jose C.T., **Ismail B** and Jayasekhar S(2008): ‘Trend, Growth Rate and Change Point Analysis - A Data Driven Approach’, *Communications in Statistics Simulation and Computation*, Vol. **37** , Issue 3, pp498-506
17. Bock M, Bowman A.W. and **Ismail B.**(2007): ‘Estimation and inference for error variance in bivariate non-parametric regression’, *Journal of Statistics and Computing*, Springer, Netherlands vol.**17** pp 39-47.
18. Bowman A.W., Pope A. and **Ismail B.**(2006): ‘Detecting discontinuities in nonparametric regression curves and surfaces’ *Journal of Statistics and Computing*, Springer, Netherlands vol.**16** pp 377-390.
19. Jose C.T. and **Ismail B.** (2003) ‘Non-parametric regression with correlated errors’, *Journal of Statistical Theory and Applications*,(USA)), Vol **2**, Number2, pp177-189.
20. Jose C.T. and **Ismail B** (2001) ‘Non-parametric Inference on Jump Regression Surface’, *Journal of Non-parametric Statistics*, (Taylor and Francis group UK) Vol.**13**, pp791-813.
21. C T Jose and **B Ismail** (2000): Non-parametric Inference on Change points in regression , *Statistical Methods*,(India) Vol **2**, No.2, pp 141-158.
22. C T Jose and **B Ismail**(1999): Change Points in Nonparametric regression function, *Communications in Statistics, Theory and Methods*,(USA) **28**, No.**8**, pp 1883-1902.
23. C T Jose and **B Ismail** (1997) Estimation of Jump points in nonparametric regression through residual analysis, *Communications in Statistics, Theory and Methods*, **26**, No.**11**, pp 2583 - 2607.

24. **B Ismail** and K K Achary (1992) On the admissibility of mixed regression estimators, *Journal of Quantitative Economics*,(India) vol **8**, No.2. pp 383-390.

#### **PUBLICATIONS IN REFEREED CONFERENCE PROCEEDINGS:**

25. Ismail B and Vidya Bai G(2010): ‘Nonparametric Analysis of Financial Data’, Proceedings of National Seminar on New trends in Applied Statistical Methodology, Nirmala Academic and Research Publications, Nirmala College, Muvatapuram, Feb 25-27, 2010.
26. Ismail B and Anjum Khan(2010) : ‘A new threshold value in curve estimation by wavelet shrinkage’, Proceedings of Xth Islamic Countries Conference on Statistical Sciences(ICCS-X), The American University in Cairo, Egypt, 2010, Vol.II, pp 786-795.
27. Ismail B and Laveena D’Costa (2012)’ Testing Heteroscedasticity in nonparametric regression’ Proceedings of International Conference ISOS at Aligarh Muslim University, Art.33 , pp1-8.
28. C T Jose and B Ismail (2001) Change Points in Nonparametric regression, In Bulletin of the International Statistical Institute, 53<sup>rd</sup> Session of ISI, Contributed papers, Book1, August 2001, Seoul, South Korea.
29. C T Jose and **B Ismail** (2001) Non-parametric estimation of discontinuous spatial functions **In**. Proceedings of the conference on Agricultural and Environmental Statistical Applications, June 2001, Rome, Italy.

#### **PUBLICATIONS IN EDITED BOOKS**

30. C T Jose and **B Ismail** (2007): ‘Estimation of Error Correlation in Nonparametric Regression’ **In:** ‘Correlated Data Modelling 2004’ Edited by Daria Gregori, Gilbert MacKenzie, Herwig Friedl and Robert Corradetti, published by Franco Angeli, Italy, 2007, pp33-39.

#### **PAPERS PRESENTED IN INTERNATIONAL CONFERENCES :**

1. Harsha S\* and **Ismail B** (2016): Detecting Speculative Bubble: Power Comparison Of Unit Root Tests, ISSAC-2016 VIII International Symposium on Statistics and Optimization in conjunction with XXXVI-Annual Convention of Indian Society for Probability & Statistics (ISPS) and Seminar on Statistical Inference, Sampling and Optimization Techniques & Related Areas (Under SAP-DRS-II), A.M.U Aligarh, during Dec17-19, 2016.

2. Harsha S\* and **Ismail B** (2015): Detecting Explosive Bubbles: A Comparative Study, international conference “New Horizons in Statistical Modeling and Applications” (NHSMA-2015) , Presidency College Chennai during Feb27-28 2015.
3. **Ismail B\*** and Ashwini Kumari (2012): “Semi-Parametric Estimation of Volatility” International conference of Frontiers of Statistics and its Applications (ICONFROST-2012) in Conjunction with XXXII Annual Convention of Indian Society for Probability and Statistics (ISPS) at Department of Statistics, Pondicherry University, Puducherry-605014, during Dec.21-23,2012.
4. **B Ismail \*** and Anjum Khan (2009) : ‘A new threshold value in curve estimation by wavelet shrinkage’, Tenth Islamic Countries Conference on Statistical Sciences (ICCS-X), American University in Cairo, Egypt, December 20-23, 2009.
5. **B Ismail\*** and Lavina C Crasta(2008): ‘Test for heteroscedasticity in nonparametric regression’ VI International Symposium on Optimization and Statistics(ISOS-2008), Department of Statistics and Operations Research, Aligarh Muslim University, Aligarh, 29-31 December 2008.
6. C T Jose\* and **B Ismail**(2004): ‘Estimation of Error correlation in Non-parametric regression’ 2ndworkshop on Correlated Data Modeling, Scientific Meeting in Honour of Diego de Castro, Torinao, held during 9th–10<sup>th</sup> January 2004.
7. C T Jose\* and **B Ismail**(2001): Change Points in Nonparametric Regression , 53<sup>rd</sup> Session of International Statistical Institute, 22nd-29th August 2001, Seoul, South Korea.
8. **B Ismail\***, M T Bock and A W Bowman(2001): Estimation of error variance in two dimensional non-parametric regression models , International Conference of Royal Statistical Society 2001 on Spatial Modelling, University of Glasgow, **Glasgow, UK** ,during 4th-6<sup>th</sup> July 2001.
9. **B Ismail\*** and C T Jose(1998):Change Point Analysis in Regression Surface, International Conference on Combinatorics, Statistics, Pattern Recognition and Related Areas,University of Mysore, December 1998.
10. K Suresh Chandra, **B Ismail\*** and KK Achary(1993):Least Squares estimators in autoregressive models with varying length moving average errors, International Conference of Indian Society of Probability and Statistics, during 22ndto 26thDecember 1993, University of Poona, PUNE.
11. **B Ismail\*** and K K Achary(1992):Improved estimators for coefficients in linear regression , The 1992 India and South East Asia Conference of Econometric Society, held during 19 -21stDec. 1992 at the Indira Gandhi Institute of Development Research, Bombay.



## PAPERS PRESENTED IN NATIONAL CONFERENCES:

1. Ismail B. ( 2018): “ Discontinuities in Non-parametric Regression Curves and Surfaces”: Invited lecture presented in the National Seminar on Recent Trends(NSRTS), held at the Department of Statistics , Calicut University, Calicut, during March 13-15.
2. Kadek Jemmy Waciko and Ismail B,(2018):”Improved Forecasting Models for Tourism”. International Conference on Theory and Applications of Statistics and Information Sciences(TASIS-2018) In Conjunction with XXXVII Annual Convention of Indian Society for Probability and Statistics(ISPS) & In Association with Indian Bayesian Society(IBS) January 5-7, 2018 held at Bharathiar University, Coimbatore.
3. Harsha S\* and **Ismail B** (2017): A New Approach to detect Financial Bubble, Two days National Conference on Reaching the Unreached through Science and Technology, Mangalore University Mangalagangothri, during Sep 8-9,2017.
4. Dileep Kumar Shetty and Ismail B.(2017):”Hybrid cyclic-ARIMA-GRACH to Improve the forecast Accuracy. Two day National Conference on Reaching unreached through Science and Technology: Recent Advances in Physical Chemical, Mathematical and Biological Sciences for Energy Health and Environment. September 8-9 2017, held at Mangalore University.
5. Ankitha M.K. and Ismail B (2017): “Partial Linear Model with Measurement Errors”. Two day National Conference on Reaching unreached through Science and Technology: Recent Advances in Physical Chemical, Mathematical and Biological Sciences for Energy Health and Environment. September 8-9 2017, held at Mangalore University.
6. Ashwini Kumari and Ismail B(2017): “A new approach for forecasting Volatility”.“Hybrid cyclic-ARIMA-GRACH to Improve the forecast Accuracy. Two day National Conference on Reaching unreached through Science and Technology: Recent Advances in Physical Chemical, Mathematical and Biological Sciences for Energy Health and Environment. September 8-9 2017, held at Mangalore University.
7. Kadek Jemmy Waciko and Ismail B,(2017): “Forecasting Tourism Demand in Bali”. Two day National Conference on Reaching unreached through Science and Technology: Recent Advances in Physical Chemical, Mathematical and Biological Sciences for Energy Health and Environment. September 8-9 2017, held at Mangalore University.
8. Harsha S\* and **Ismail B** (2017): A New Test for Detecting Financial Bubble, Two days National Seminar on Statistical Inference and Stochastic Modeling, Karnatak University Dharwad during Feb 22-23, 2017.
9. Harsha S\* and **Ismail B** (2015): ‘Duration Dependence Test to Detect Financial Bubble using Generalized Logistic Hazard Function’, National conference “Recent Trends in Statistical inference and data analysis”, during 30<sup>th</sup> and 31<sup>th</sup> October 2015 SDM PG Centre Ujire.

10. Harsha S\* and **Ismail B** (2015): 'Detecting Speculative Bubble', 39<sup>th</sup> Indian Social Science Congress, during Dec 1-5, 2015 at Mangalore University, Mangalagangothri
11. Ismail B (2015): 'Forecasting Financial Time Series', UGC sponsored National Seminar on Statistical Inference and Stochastic Modelling, held at Department of Statistics, Karnataka University Dharwad, during 25-28 Feb.2015,
12. **Ismail B** and Ashwini kumari (2015): 'Forecasting Seasonal Volatility Models', UGC sponsored National Seminar on Applications of Statistics in research, Planning and Industry, held at Department of Statistics, Mount Carmel College, Autonomous, Bangaluru, during February 05-07, 2015.
13. Ataula and **Ismail B**(2013): Wavelets in the analysis of Autoregressive Conditional Heteroscedasticity models using Neural Network' National Conference on Analysis and Application of Mathematics(NCAAM 2013) held at Reva Institute of Technology and Management, Bangalore, 22-23, Feb.2013.
14. Manjula Suvarna and **Ismail B**(2013): 'Regression methods for analyzing the risk factors for a life style disease among the young population of south India', 31<sup>st</sup> Annual Conference of Indian Medical Statistics(ISMS CON) held at Department of Biostatistics, Christian Medical College, Baghyam, Vellore - 632002, Tamil Nadu, during 24-26 october 2013.
15. Anjum Khan\* and **Ismail B**(2011) " Detection of Jump and cusp using Haar Wavelets in a regression function" , National Conference on Recent Developments in Statistics, Dept.of Statistics, Gulbarga University, September 8-9,2011.
16. Anjum Khan\* and **Ismail B**(2011) " Image denoising using stationary wavelet transform",National Conference on Modern Trends in Science and Technology, Dr. M.V.Shetty Institute of Technology, Moodbidiri. October 14-15,2011.
17. Anjum Khan\* and **Ismail B** (2011)"Image Thresholding using Discrete wavelet transform", XXXI st annual Convention of Indian Society for Probability and Statistics(ISPS), Cochin University of Science and Technology, Cochin, Dec.19-22, 2011.
18. Ashwini Kumari\* and **Ismail B** (2011) " Predicting Bankruptcy using logistic regression" , XXXI st annual Convention of Indian Society for Probability and Statistics(ISPS), Cochin University of Science and Technology, Cochin, Dec.19-22, 2011.
19. **B Ismail\*** (2009) 'Change Points in non parametric regression' , UGC sponsored National Seminar on Recent Trends in Statistics, Nehru Arts and Science College, Kanhagad, Kerala, 12-14 February 2009.
20. **B Ismail\*** (2008):'Discontinuities in Non-parametric regression curves and surfaces' National Seminar on Recent Advances in Statistics and Analysis of

Non-Conventional data and Annual Conference of Kerala Statistical Association, Farook College, Kozhikode, Kerala, 15-17<sup>th</sup> March 2008.

21. **B Ismail\*** and C.T. Jose (2007): 'Spatial Smoothing Technique in Field Experiments' National Seminar on Frontiers in Applied Statistics and Computer Applications FASCA-07, Bharathiar University, Coimbatore, January 2007.
22. **B Ismail** and R Suresh Kumar\* (2004): Inference on non-Parametric Regression with Jump Points, XXIV Annual Conference of Indian Society for Probability and Statistics and National Seminar on Recent Advances in Statistical Theory and Application , held at Palai, Kerala during 4-6 November 2004.
23. **B Ismail\*** (2004):Change Point Estimation using non-parametric regression (Invited talk)-UGC sponsored national Seminar on Recent Developments in Data collection and Analysis, held at Sardar Patel University, Gujarat, during 29<sup>th</sup>-31<sup>st</sup> Jan., 2004.
24. **B Ismail\*** and A W Bowman(2003): On variance estimation in Non-parametric Regression, XXIII Annual conference of Indian Society for Probability and Statistics, held at Nagarjuna University, Guntur, A.P., during 18-20 December 2003.
25. Asha Kamath and **B Ismail\*** ( 1998):Multicollinearity in varying coefficient repeated measures regression model , 34<sup>th</sup> Annual conference of the Indian Econometric Society held during March 27-30, 1998 at Mangalore University.
26. C T Jose\* and **B Ismail**(1998): Nonparametric Regression estimation with correlated errors, National Seminar on Stochastic Systems during February 5 -7, 1998, Mangalore University.
27. Asha Kamath\* and **B Ismail** (1995): Multicollinearity in repeated measures regression models), National Seminar at Shivaji University, Kolhapur.
28. K Suresh Chandra, **B Ismail\*** and KK Achary (1991): Autoregressive model with varying length moving average errors), National Seminar on Statistical Inference and Related Topics, held during 7-8 March 1991 at Bangalore University.
29. **B Ismail** and K K Achary\*(1991): Mean Square Error Matrix Improvements and Admissibility of some biased linear estimators, XIIth Annual Conference of Indian Society for Probability and Statistics and Symposia on Stochastic Analysis and Distribution Theory , held during 9-12 Dec.1991 at Cochin University of Science and Technology, Cochi.

30. **B Ismail\*** and K K Achary(1989): On the Admissibility of restricted least squares estimators, X Annual conference of Indian Society for Probability and Statistics and International Symposium on Stochastic Models, Analysis and Applications held during 15-19th June 1989 at Karnataka University, Dharwad.

(\* Author who presented the paper)