Statistics and Risk Management Seminar

Department of Mathematics, NOVA MATH/FCT NOVA

Title: Directional Statistics in modelling high volatility

Speaker: Ashis SenGupta, CSIR Emeritus Scientist, Govt of India; Augusta University, Georgia, USA; METU, Turkey

Date | Time: September 18, 2025 | 14:30

Location: To be announced

Teams: https://teams.microsoft.com/meet/3269279669007?p=0eELVWbH4nmBKh500S

Abstract: Modern data in many areas of applied science are characterized by high volatility, e.g. long tails as well as high kurtosis or peakedness. They also exhibit asymmetry and multimodality. Classical families of distributions with well-defined probability density functions are inadequate to model such data. On the other hand, families that may be good contenders for modelling high volatility do not in general admit probability density functions on the Euclidean manifold. But these families often can be mapped onto non-Euclidean manifolds, through deep results involving characteristic functions, for which the densities can have elegant Fourier series representations. This connection also immensely helps in statistical inference for the associated parameters. Also, on their own these families provide ample flexibilities in modelling data on non-Euclidean manifolds. We first develop the related theories for deriving these highly flexible families. Next, optimal inference procedures are outlined. Finally, emerging real-life examples from both Euclidean and non-Euclidean manifolds are presented to illustrate the results.

Short Bio: Professor Ashis Sengupta holds a Ph.D. from Ohio State University, under the supervision of Professor C. R. Rao. He advised 17 Ph.G. students in India, turkey and USA and he has more than 120 publications, including 12 books and volumes in Multivariate Analysis, Directional Statistics, Statistical Machine Learning, Financial Statistics and Reliability Inference. He is an Emeritus Scientist at the Indian Institute of Technology, Kharagpur, Advisor/Consultant at the Indian Statistical Institute, Adjunct Professor at Augusta University, Georgia, USA, a Distinguished Professor at the Middle East Technical University in Turkey and an Advisor at Analythium, Canada. He was a Visiting Professor in several Universities, including Stanford University, University of California-Santa Barbara and Riverside, University of Wisconsin-Madison, University of Missouri- Columbia, Michigan State University, Concordia University, Institute of Statistical Mathematics and Keio University (Japan), Haceteppe University (Turkey), University of Malaya (Malaysia), Daegu University (South Korea), Academia Sinica (Republic of China), as well as other Universities in Canada, Belgium, Sweden, Germany and Israel. He is an ex Editor-in-Chief of Environmental and Ecological Statistics (Springer, USA), and of the Journal of the Indian Society for Probability and Statistics and an Associate Editor for the Book series of the Forum of International Mathematics, Springer. He visited mainland China as Citizen Ambassador from American Statistical Association and is the recipient of several International and National recognitions, including 2 Lifetime Achievements and Distinguished Statistician Awards. He was elected President of the Mathematical Sciences section of the Indian Science Congress in 2011-2012 and he is an Elected Member of the International Statistical Institute, Fellow of the National Academy of Sciences, India and, of the Indian Society for Probability and Statistics and of the American Statistical Association – currently the only working statistician in India with this recognition.

Organizers: Isabel Natário and Mina Norouzirad and Carlos Agra Coelho

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