Hong Kong WSC 2013 - Short Course programme

COURSE TITLE

Heavy Tail Phenomena

DURATION

1 day

INSTRUCTOR 1

Thomas Mikosch, Professor, University of Copenhagen, Denmark

BIOGRAPHICAL SKETCH

Thomas Mikosch got his PhD from the University of St. Petersburg in 1984. He held positions in Dresden, Zurich, Wellington, Groningen. Since 2001 he is professor at the Department of Mathematics of Copenhagen University. He published about 100 scientific articles and 4 books. He served at the editorial boards of *SPA, Annals of Applied Probability, Bernoulli, Applied Probability Journals,* and other journals. He was the Editor-in-Chief of *SPA* in 2009-2012, organized various international conferences on probability and statistics and is Elected Fellow of the IMS, Member of the Royal Danish Academy of Sciences and Letters. His scientific interests are applied probability and stochastic processes, extreme value theory and time series analysis.

COURSE DESCRIPTION

The aim of this course is to give a gentle introduction to the field of heavy tail phenomena with applications in insurance and finance. We will study the interplay between heavy tails of distributions and processes, and their dependence structure, in particular how heavy tails build up in stochastic models and how heavy tailed components influence the structure of the process. A central condition in this context is multivariate regular variation; see Resnick (2007) for a recent account on the topic. Regular variation is a flexible tool for describing extremal dependence in space and time. It refers to power law behaviour of the tails (in the wide sense) and has found a multitude of applications in financial time series analysis, reinsurance, telecommunications. For example, large classes of financial time series models (GARCH, stochastic volatility models) have the property of regular variation. Special attention will be given to measures of serial extremal dependence (i.e. the degree of clustering) beyond correlations, and their estimation.

Literature

Andersen, T.G., Davis, R.A., Kreiss, J.-P. , Mikosch, T. (2009)
Handbook of Financial Time Series. Springer, Berlin.

Resnick, S.I. (2007)
Heavy-Tail Phenomena. Probabilistic and Statistical Modeling.
Springer, New York.

SYLLABUS

Lecture notes and transparencies of the course will be made available on some website.

TARGET AUDIENCE

The course aims at graduate students and researchers interested in applied probability, statistics, econometrics, time series analysis, extreme value theory, insurance mathematics. It is desirable that the participants of the course have some basic knowledge in applied probability theory, statistics, and extreme value theory, but specialist knowledge is not required.