DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE
THE UNIVERSITY OF HONG KONG

Public Seminar of PhD Candidate

Mr. LO Ambrose

Department of Statistics and Actuarial Science
The University of Hong Kong

will give a talk

entitled

SOME NEGATIVE DEPENDENCE STRUCTURES AND THEIR APPLICATIONS

Abstract

This talk centers on two extreme negative dependence structures in different dimensions and presents their novel characterizations and applications to risk management.

Bivariate random vectors are treated in the first part of the talk, where the characterization of comonotonicity by the optimality of aggregate sums in convex order is extended to its bivariate antithesis, namely, counter-monotonicity. It is shown that two random variables are counter-monotonic if and only if their sum is minimal with respect to convex order. This defining property of counter-monotonicity is then exploited to identify a necessary and sufficient condition for merging counter-monotonic positions to be risk-reducing.

In the second part, the notion of mutual exclusivity is introduced as a generalization of counter-monotonicity to a multi-dimensional setting. Various characterizations of mutually exclusive random vectors are presented, including their pairwise counter-monotonic behavior, minimal convex sum property, and the characteristic function of their aggregate sums. These properties highlight the role of mutual exclusivity as the strongest negative dependence structure in a multi-dimensional setting. As an application, the practical problem of deriving general lower bounds on the convex expectations and Tail Value-at-Risk of aggregate sums with arbitrary marginal distributions is considered. The sharpness of these lower bounds is characterized via the mutual exclusivity of the underlying random variables. Compared to existing bounds in the literature, the new lower bounds proposed enjoy the advantages of generality and simplicity.

on

Wednesday, June 25, 2014

10:00 a.m. – 11:00 a.m.

at

Room 524, Meng Wah Complex
(behind the Chong Yuet Ming Amenities Centre)

Visitors Please Note that the University has limited parking space. If you are driving please call the Department at 2859 2466 for parking arrangement.

All interested are welcome