

# BIG DATA & ALGORITHMIC FINANCE



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I am a Professor at the Departments of Economics at the University of Toronto and at Toulouse School of Economics, and a member of the chair «Regulation and Systemic Risks». I received a degree from ENSAE, the aggregation of Mathematics and obtained a thesis (Thèse d'état) from the University of Rouen. I have published 20 books and about 250 papers in Journals as *Econometrica*, *Review of Economic Studies*, *Journal of Political Economy*, *Journal of Econometrics*, *Review of Finance*. Currently, I have been working on estimation and inference for noncausal processes and on the modelling and management of long run risk. I have received the silver medal from CNRS and honorary doctorates from the Universities of Montreal, Neuchatel and Mons.

## **THE RISK OF RANDOM SETS WITH APPLICATIONS TO BASKET DERIVATIVES**

Christian Gourioux, Yang Lu and Alain Monfort.

This paper analyzes the risks in random sets and their implications for basket derivatives. Based on an extension of integration by parts for random set, we define stochastic dominance of order 1 and 2 for random sets. Since the ordering of sets, that is the inclusion, is a partial order, we have to distinguish left and right notions of stochastic dominance. The observed sets are in a one-to-one relationship with observed multivariate binary variables, each component of which indicating high or low risk for a given type of risk. This relationship is used to define basket derivatives and to develop statistical inference. We consider the special cases of exchangeability, of Law of Determinantal Point Process (LDPP), of local pairwise interactions and of block models for illustration.

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