Doctoral Thesis

Applications of dependence concepts in insurance and finance

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Applications of dependence concepts in insurance and finance

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presented by
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The first part of this thesis is devoted to the illustration of the concept of a dependence structure and to the issue of the comparison of such structures. The important message is that, contrary to some of the most used measures of dependence like linear correlation, the identification and the analysis of a dependence structure requires mathematical instruments beyond simple numerical quantities. In particular, it turns out that copulae can be interpreted as dependence structures and that stochastic orders allow for the definition of their riskiness.

The methodology presented applies to the solution of different problems ranging from risk theory to risk management and extreme value theory. In Chapter 3 results concerning the influence the dependence has on the ruin probability of a risk process where the single claims are sums of dependent random variables are obtained. Chapter 4 is the application of the theory of copulae to the problem of bounding the Value-at-Risk of a functional of dependent risks. Finally, Chapter 5 proposes a bivariate analogue in terms of copulae of the Pickands–Balkema–de Haan Theorem of extreme value theory for conditional bivariate extremes whose dependence structure is archimedean.