A Flexible Approach to Multivariate Risk Modelling with a New Class of Copulas

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We present results on the distortion of copulas for risk modelling. We propose a new class of copulas constructed using piece-wise linear distortions of some standard copulas. The method of construction of these copulas allows them to be calibrated by fitting to empirical multivariate risk data. We derive properties of this new class of copulas and present results from applying the distortions to a range of copulas including the Gaussian and Archimedean copulas. Gaussian copulas are often used in modelling credit risk portfolios and for many risk modelling applications in practice. We show how our approach can be applied to Gaussian copulas and derive properties of the distorted copulas. We consider tail dependence measures and show how distorted copulas can model various forms of tail dependence. The new form of distorted copula is relevant for numerical computation in insurance and financial risk modelling including risk measurement and management of portfolios.

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