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Rank-Based Inference Tools for Copula Regression, with Insurance Applications

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Copula regression models are quickly gaining in popularity as risk management tools. In insurance, for example, they have recently found important applications in reserve estimation and risk capital calculation from loss triangle data, and in portfolio management of auto and multi-peril homeowners insurance claims. In this talk, I will describe some of these applications and explain how rank-based procedures commonly used for inference in copula models with continuous margins can be adapted to the broader context of copula regression models. The validity of many of these techniques can be derived from the asymptotic equivalence between the classical empirical copula process and its analogue based on suitable residuals from the marginal models. As we will see, however, moment-based parameter estimation and copula goodness-of-fit tests are valid under weak conditions on the marginal error term distributions, even when the residual-based empirical copula process does not converge. I will also report results from a simulation study evaluating the performance of these procedures in finite samples in the context of two insurance applications: micro-level multivariate insurance claims, and dependent loss triangles.

This is joint work with Marie-Pier Côté and Marek Omelka.

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