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Approximate Copula Regression

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Regression analysis is one of the most commonly used statistical methods for analyzing relationships in data. However, in its basic form, ordinary least squares (OLS) is often not suitable for actuarial applications because of the non-linear relationship between variables and non-normal, and often heavy-tailed, distributions of the data. In this paper several issues surrounding the 2011 paper Copula Regression, Variance volume 5-issue1, by Rahul A. Parsa and Stuart A. Klugman, will be discussed. First, several different approximations to the exact form of Copula Regression will be presented and applied to several heavy-tailed data sets. Formulas for these approximations will be presented, and the relationship to the aforementioned form of Copula Regression will be analyzed. In the process, the utility of Copula Regression for analyzing data with non-linear relationships and non-normal marginals will be reinforced. In addition, the relationship between what the authors have dubbed Approximate Copula Regression and OLS regression will be illustrated, and investigated.