

Bayesian Bivariate Distributional Copula Regression of Birth Weight and Gestational Age

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with

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We apply distributional regression models to birth data with a bivariate response. In comparison to a standard univariate approach for the birth weight with the gestational age as the most important factor, we use copulas to model the dependence of these variables and their marginals simultaneously and independently. Each parameter of this distribution is modelled conditional on the covariates via an appropriate link function. The regression coefficients are estimated by MCMC with flat normal priors using the BayesX software. We compare Normal and Dagum marginal families. The three-parametric Dagum distribution is more suitable for the skewed data, certain transformations have to be applied before. Gauss, Gumbel, and Clayton copula families are applied, where the Clayton copula performs slightly better, in accordance with a presumed tail dependency.

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