Flexible bivariate Poisson integer-valued GARCH model

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Abstract
Integer-valued time series models have been widely used, especially integer-valued autoregressive models and integer-valued generalized autoregressive conditional heteroscedastic (INGARCH) models. Recently, there has been a growing interest in multivariate count time series. However, existing models restrict the dependence structures imposed by the way they constructed. In this paper, we consider a class of flexible bivariate Poisson INGARCH(1,1) model whose dependence is established by a special multiplicative factor. Stationarity and ergodicity of the process are discussed. The maximization by parts algorithm and its modified version together with the alternative method by using R package Template Model Builder are employed to estimate the parameters of interest. The consistency and asymptotic normality for estimates are obtained, and the finite sample performance of estimators is given via simulations. A real data example is also provided to illustrate the model.

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