

Random coefficients self-exciting threshold integer-valued autoregressive processes driven by logistic regression

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Abstract: In this article, we introduce a new first-order random coefficients self-exciting threshold integer-valued autoregressive processes. The autoregressive coefficients are driven by a logistic regression structure, so that the explanatory variables can be included. Basic probabilistic and statistical properties of this model are discussed. Conditional least squares and conditional maximum likelihood estimators, as well as the asymptotic properties of the estimators are discussed. The nonlinearity test problem is also addressed. As an illustration, we evaluate our estimates through a simulation study. Finally, we apply our method to the data sets of sexual offences in Ballina, New South Wales (NSW), Australia, with two covariates of drug offences and temperature. The result reveals that the proposed model fits the data sets well.