LATENT GAUSSIAN COUNT TIME SERIES MODELLING

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This work puts forth a new paradigm for parametric modeling of stationary count time series. The methods use a latent Gaussian process and a distributional transformation to construct stationary series with very flexible autocovariance structures, including long memory, that can have virtually any pre-specified marginal distribution, for example, the classical Poisson, generalized Poisson, negative binomial, and binomial count structures. Two estimation approaches are considered: a least squares approach based on calculating the autocovariance function of a stationary count series, which involves Hermite expansions and a new computational formula for Hermite coefficients, and a particle filtering approach approximating the full likelihood of the model, which extends some of the usual hidden Markov techniques to stationary processes. The efficacy of the approaches is demonstrated in simulations, and several real count time series are also analyzed, with the results compared to those using other count time series models found in the literature.