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Nonlinear Network autoregression

We study general nonlinear models for time series networks of integer and continuous valued data. The vector of high dimensional responses, measured on the nodes of a known network, is regressed non-linearly on its lagged value and on lagged values of the neighboring nodes by employing a smooth link function. We study stability conditions for such multivariate process and develop quasi maximum likelihood inference when the network dimension is increasing. In addition, we study linearity score tests by treating separately the cases of identifiable and non-identifiable parameters. In the case of identifiability, the test statistic converges to a chi-square distribution. When the parameters are not-identifiable, we develop a supremum-type test whose p -values are approximated adequately by employing a feasible bound and bootstrap methodology.