

Local stationarity and time-inhomogeneous Markov chains

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In this paper, we revisit a notion of local stationarity for fitting time-inhomogeneous Markov chains models. We consider triangular arrays of time-inhomogeneous Markov chains, defined by some families of contracting and slowly-varying Markov kernels. Using the Dobrushin's contraction coefficients for adapted probability metrics, we show that the distribution of such Markov chains can be approximated locally with the distribution of ergodic Markov chains. Mixing properties of these triangular arrays are also discussed. As a consequence of our results, some classical geometrically ergodic homogeneous Markov chains models have a locally stationary version. In particular, we consider a model of finite-state Markov chains with a time-varying transition matrix which is estimated nonparametrically.