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A propagation-separation approach to estimating the autocorrelation in a time-series

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The paper presents an approach to estimating parameters of the AR(1) process using maximization of the local likelihood function. The method is based on a propagation-separation procedure with an adaptive choice of weights for every pair of data points. Using free propagation of weights under homogeneity, the method is capable of separating the regions in a time-series where the model parameters can be approximated by a piecewise constant function. The performance of the method is illustrated by applications to synthetic data and real time-series of reconstructed NAO and ENSO indices. The approach can potentially be used in dendroclimatic studies for the quality control of prewhitened tree-ring chronologies or any other time-series affected by persistence not related directly to climate signal.