

Nonparametric Tools for Modeling Hydroclimate Time Series

R. Balaji (Balaji Rajagopalan)

University of Colorado
Cooperative Institute for Research in Environmental Sciences
Department of Civil, Environmental and Architectural Engineering

Abstract:

Nonparametric functional estimation methods offer a complimentary and attractive alternative to traditional methods that can be restrictive in their assumptions and ability to capture any arbitrary feature exhibited by the data. We have developed a suite of tools based on local polynomial estimation and K nearest-neighbor bootstrap for simulation and forecasting of hydroclimate time series.

This talk will feature a sampling of four tools for various application - (1) Stochastic daily weather generator - to generate daily weather sequences at multiple locations conditional on large-scale seasonal forecast for use in process models such as agriculture and water resources; (2) Streamflow simulation - a space-time disaggregation method to generate streamflow sequences at several locations on a river network; (3) Combining paleo reconstructed and observed streamflows for simulation - a nonhomogeneous Markov chain is used to model the wet/dry state of the system and a K-NN resampling is employed to generate flow magnitude; (4) Local polynomial based flood frequency estimation - local polynomial estimation is used to smooth the empirical flood quantiles. Being simple to understand in implement they are finding receptive audience with practitioners such as water resource managers and reservoir operators.

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