Testing relevant hypotheses in functional time series via self-normalization

Holger Dette

(Ruhr-Universität Bochum)

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In this paper we develop methodology for testing relevant hypotheses in a tuning-free way. Our main focus is on functional time series, but extensions to other settings are also discussed. Instead of testing for exact equality, for example for the equality of two mean functions from two independent time series, we propose to test a *relevant* deviation under the null hypothesis. In the two sample problem this means that an L^2-distance between the two mean functions is smaller than a pre-specified threshold. For such hypotheses self-normalization, which was introduced by Shao (2010) and is commonly used to avoid the estimation of nuisance parameters, is not directly applicable. We develop new self-normalized procedures for testing relevant hypotheses and demonstrate the particular advantages of this approach in the the comparisons of eigenvalues and eigenfunctions.

Reference:
Holger Dette, Kevin Kokot and Stanislav Volgushev (2020). Journal of the Royal Statistical Society Series B, vol. 82, issue 3, 629-660