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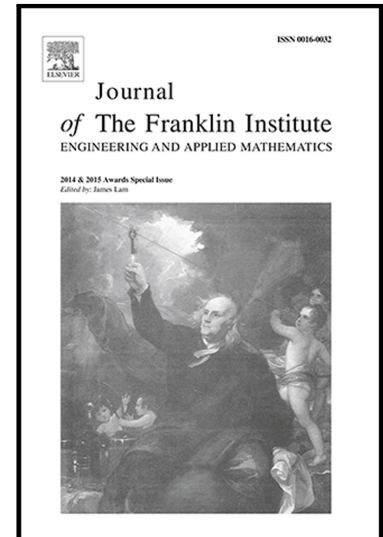
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The benefits of multivariate singular spectrum analysis over the univariate version

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Abstract

Singular Spectrum Analysis (SSA) is a relatively simple and powerful method in the area of time series analysis that is mainly based on matrix analysis. In this paper, we present a methodological comparison between the univariate and multivariate versions of SSA. Additionally, we explore the advantages of multivariate SSA in terms of theoretical results and with application to a real data set on currency exchange rates.

Keyword: Forecasting, Multivariate SSA, Univariate SSA, Time series analysis

1 Introduction

The analysis of time series is one of the major research topics in statistics and widely used and relevant in many fields of application. Since in some cases the interest lies in the analysis and forecast of a single time series (univariate case) and in other cases the interest is to analyse and forecast simultaneously multiple time series (multivariate case), there are several methodologies adapted to analyse and forecast both univariate and multivariate time series. The non-parametric singular spectrum analysis (SSA) methodology is no different, as it can be applied to a single time series or jointly to several time series, being the latter referred as *multivariate singular spectrum analysis* (MSSA). Similarly to the case of parametric modelling and in many real-life applications, two or more time series may be related, which in the

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