

# **Robust singular spectrum analysis: Methodology and application**

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Singular Spectrum Analysis (SSA) is a powerful and widely used non-parametric method to analyze and forecast time series. Although SSA has proven to outperform traditional parametric methods for model fit and model forecasting, one of the steps of the SSA algorithm is the singular value decomposition (SVD) of the trajectory matrix, which is very sensitive to the presence of outliers because it uses the L2 norm optimization. Therefore, the presence of outlying observations has a significant impact on the SSA reconstruction and forecasts. The main aim of this talk is to introduce several robust alternatives to SSA, where the SVD is replaced by robust SVD and robust PCA alternatives. The SSA and the six robust SSA alternatives are compared in terms of model fit and model forecasting via Monte Carlo simulations based on synthetic and real data, considering several contamination scenarios. Joint work with Mohammad Kazemi, Rahim Mahmoudvand, and Vanda Lourenço.<sup>4</sup> Why do we need efficient statistical computing? 5. Statistical thinking regarding when to use/avoid 'black-box' algorithms