Cover Letter: An M-Estimator for Reduced-Rank System Identification

Dear Reviewer,

Thanks for taking your time to review this paper. This cover letter is intended to give you a quick overview of the submitted work.

In this paper, we have taken a first step towards the modeling and estimation of high-dimensional time-series data. Fitting statistical models to high dimensional time series data, to enable parameter estimation and prediction, is an important computational primitive. Existing methods, however, are unable to cope with the high-dimensional nature of these data, due to both computational and statistical reasons. We mitigate both kinds of issues by proposing an M-estimator for Reduced-rank System IDentification (Mr. Sid). A combination of low-rank approximations, ℓ_1 and ℓ_2 penalties, and some numerical linear algebra tricks, yields an estimator that is computationally efficient and numerically stable.

Simulations and real data examples demonstrate the usefulness of this approach in a variety of problems. Mr. Sid therefore enables big time-series data to be analyzed using standard methods, readying the field for further generalizations including nonlinear and non-Gaussian state-space models.

Thanks again
Authors