1139-60-254   **Anish Agarwal**, **Muhammad Amjad** and **Devavrat Shah*** (`devavrat@mit.edu`), 32 Vassar Street, 32-D670, Cambridge, MA 02139, and **Dennis Shen**. *Time Series Analysis via Matrix Estimation.*

We consider the task of interpolating and forecasting a time series in the presence of noise and missing data. As the main contribution of this work, we introduce an algorithm for this task that transforms the observed time-series into a matrix, utilizes the singular value thresholding algorithm from matrix estimation literature to recover missing time-series as well as de-noise observed time-series and then perform a simple linear regression to do forecasting. We argue that this method provides meaningful imputation and forecasting for a large class of models: finite sum of harmonics which approximate stationary processes, non-stationary sub-linear trends, linear time invariant systems and mixtures of all of these. Our method can be viewed as one which recovers the hidden state of dynamics based on its noisy observations, like that in a hidden Markov model (HMM), as long as the hidden dynamics obeys the above stated models. We demonstrate on synthetic and real-world datasets that our algorithm outperforms standard software packages in the presence of significant missing data and high levels of noise even when the software package is told what is the underlying model while ours is not. (Received February 13, 2018)