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Latent Structures for Serially Dependent Data

Many chemometrics methods like Principal Component Analysis (PCA) function under the assumption of time independent observations, which may not be valid in most industrial applications. This is particularly true when PCA is employed for multivariate statistical process control. To handle time dependent data, Dynamic PCA (DPCA) has been proposed, which incorporates expanding the feature matrix with lagged versions of itself to capture time-dependent relationships. This however introduces challenges such as selecting the number of lags as a hyperparameter and the interpretation of the latent structures as they are potentially composed of numerous features including their lagged versions. In this paper, we investigate the means for proper selection of the number of lags based on the autocorrelation structure of the original features and clearer understanding of the contributions of these features and their lagged versions in the latent variables through regularization.

Special/ Invited session

Classification

Mainly methodology

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