# Sliced inverse regression for time series

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## 1 Background

When analysing data with a response variable $y$ and explanatory variables $\mathbf{x}$, modelling may become infeasible when number of variables gets higher. It can also cause computational problems and visualization of data becomes harder.

To avoid these kind of problems we can use Sliced Inverse Regression (SIR) (**?**), which is a supervised dimension reduction method and it is used to study a relationship between the response $y$ and the variables $\mathbf{x}$. However, in case of time series SIR algorithm does not use any information on lagged values directly. One way to deal with this is to treat explanatory variables and their past values and the past values of response variable as explanatory variables. (**?**)

## 2 A new method for time series data

We suggest in **?** a new method, which is based on SIR algorithm, but instead of using a regular supervised covariance matrix, we use several lagged supervised covariance matrices. We show how our new algorithm can be used to determine which lags and directions are the most important ones when trying to predict future values. Some illustrative examples are presented in order to see how our algorithm performs in different kind of situations.

# References

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