

# MATEMATIČNI KOLOKVIJI

## Data driven computational analysis of nonlinear dynamics

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The Dynamic Mode Decomposition (DMD) has become a tool of trade in computational data driven analysis of complex dynamical systems, e.g. fluid flows, where it can be used to decompose the flow field into component fluid structures, called DMD modes, that describe the evolution of the flow. The DMD is deeply connected with the Koopman operator spectral analysis of nonlinear dynamical systems, and it can be considered as a computational device in the Koopman framework. Its exceptional performance motivated development of several modifications that made the DMD an attractive method for analysis, identification, forecasting and model order reduction of nonlinear systems in data driven settings.

This talk will present recent results on the numerical aspects of the DMD/Koopman analysis in a data driven framework. It will be shown how the state of the art numerical linear algebra can be deployed to improve the numerical performances in cases that are usually considered notoriously ill-conditioned. Recent software development will be presented.

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