Lehrstuhl für Baumechanik
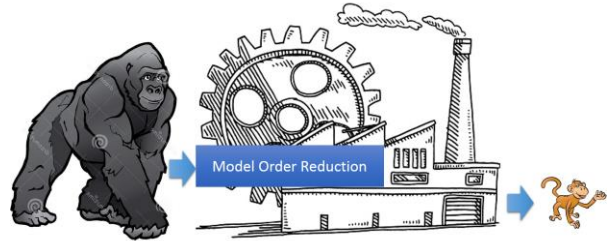
Software Lab:

Mathematics: ★★★★☆
Programming: ★★★★★

Model Order Reduction Library

Setting

Due to the flexibility and performance of our current computers, modeling and simulation of natural phenomena can be considered as a third scientific methodology (joining the theoretical and experimental approach). Mechanical systems usually lead to models, which after discretization, using a numerical approach, result in a large system of equations. In computational mechanics such problems sometimes need to be solved several times like in the case of a frequency response analysis. For such cases where computational cost is a restriction several Model Order Reduction (MOR) Techniques have been developed to achieve a lower-order model that approximate the behavior of the system just as precise as the original model.

Task

The Task in this Software Lab is the implementation of MOR Techniques for second order systems in Java environment.

- Implementation of different kinds of MOR techniques (classical and state-of-the-art Methods).
- Compare the time efficiency for solving the system of equation using commercial FE software and your implemented algorithm.

Software

Eclipse IDE

Supervisors

Raúl Rodríguez, chair of Structural Mechanics, raul.rodriguez@tum.de
Dr.-Ing. Martin Buchschmid, Chair of Structural Mechanics, martin.buchschmid@tum.de

References

[1] Rodríguez Sánchez R., *Model Order Reduction in Structural Dynamics/Master Thesis*, 2015.