## INVENTUM
Engineering Solutions

Workshop

Overview of model reduction strategies in structural dynamics

Topics

The workshop will provide a walkthrough into the jungle of model reduction for structural dynamics applications. The content is intended as intensive training for industrial realities or anyone in need of a guide to wisely explore opportunities in the field of model reduction.
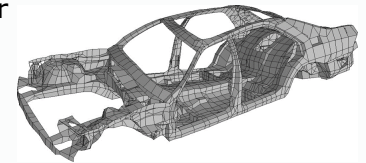
The content is subdivided into lectures as follows:

1. Intro to finite elements and flexible multibody
Short description of finite element methods and multibody frameworks for flexible systems

2. Intro to linear model order reduction & commercial techniques
Introduction to projection-based reduction concepts, assembly with substructuring, commercial software solutions (e.g. Abaqus, Ansys, Nastran, etc.)

3. Advanced linear model order reduction & parametric reduction
State-of-the-art and advanced projection-based reduction techniques (not commercially available), parametric extension of model reduction strategies

4. Substructuring & transfer path analysis
Look into reduction and assembly of experimentally-determined systems, experimental-numerical hybrid modeling and transfer of vibrations

5. Nonlinear model order reduction
Reduction extended to nonlinear systems, linear and nonlinear basis, hyperreduction, SSM

6. Data-driven & surrogate modeling/identification
Look into the use of data-driven modeling in structural dynamics, Koopman theory, sparse identification, neural networks, gaussian processes

7. Nonlinear dynamics solution techniques
Nonlinear numerical solvers, computation of periodic solutions (e.g. shooting, harmonic balance), steady-state analysis, nonlinear modal analysis

Organizers:

Francesco Trainotti; Tomas Slimak

Participation

Duration: 3 days
Where: online/hybrid/in-person
When: to be arranged

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