

Module Handbook (<https://modhb.uni-kl.de/>)

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Course MAT-81-39-K-7

Model Order Reduction for Large Scale Systems (2V, 4.5 LP)

Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
2	V	Lecture	4.5 CP	28 h / 107 h
(2V)			4.5 CP	28 h / 107 h

Basedata

SWS	2V
CP, Effort	4.5 CP = 135 h
Position of the semester	1 Sem. irreg.
Level	[7] Master (Advanced)
Language	[EN] English
Lecturers	Damm, Tobias, Prof. Dr. (PROF DEPT: MAT) (/staff/7/) Pinnau, René, Prof. Dr. (PROF DEPT: MAT) (/staff/27/) + further Lecturers of the department Mathematics
Area of study	[MAT-TEMA] Industrial Mathematics
Additional informations	Informations about the course (https://www.mathematik.uni-kl.de/techno/lehre/)
Lifecycle-State	[NORM] Active

Contents

Model reduction methods for ordinary and partial differential equations are discussed, in particular

- Krylov space methods,
- reduced bases,
- Proper Orthogonal Decomposition (POD).

Literature

- A.C. Antoulas: Approximation of Large-Scale Dynamical Systems,

- A.T. Patera and G. Rozza, Reduced Basis Approximation and A Posteriori Error Estimation for Parametrized Partial Differential Equations,
- P. Benner, V. Mehrmann, D.C. Sorensen: Dimension Reduction of Large-Scale Systems,
- W.H. Schilders, H.A. van der Vorst, J. Rommes: Model Order Reduction: Theory, Research Aspects and Applications.

Materials

[MAT:LIT]

Requirements for attendance (informal)

Modules:

- [MAT-10-1-M-2] Fundamentals of Mathematics (M, 28.0 LP) (/mhb/modules/MAT-10-1-M-2/)
- [MAT-80-11A-M-4] Numerics of ODE (M, 4.5 LP) (/mhb/modules/MAT-80-11A-M-4/)
- [MAT-80-11B-M-4] Introduction to PDE (M, 4.5 LP) (/mhb/modules/MAT-80-11B-M-4/)

Courses

- [MAT-12-25-K-3] Introduction to Ordinary Differential Equations (2V+1U, 4.5 LP) (/mhb/courses/MAT-12-25-K-3/)
- [MAT-14-11-K-3] Introduction to Numerical Methods (4V+2U, 9.0 LP) (/mhb/courses/MAT-14-11-K-3/)

Requirements for attendance (formal)

None

References to Course [MAT-81-39-K-7]

Module	Name	Context
[MAT-81-39-M-7 (/mhb/modules/MAT-81-39-M-7/)]	Model Order Reduction for Large Scale Systems	P: Obligatory 2V, 4.5 LP