Mathematisches Forschungsinstitut Oberwolfach

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Banach Center
INSTITUTE OF MATHEMATICS PAS

# Model Reduction and Approximation: Projection-, Tensor- and Data-based Methods

## Banach Center – Oberwolfach Graduate Seminar

Organizers: Bernard Haasdonk, Stuttgart
Anthony Nouy, Nantes
Mario Ohlberger, Münster
Stefan Volkwein, Konstanz
Date (ID): 1 - 7 November 2020 (2045a)
Deadline: 1 August 2020

Many physical, chemical, biomedical, and technical processes can be described by means of partial differential equations or dynamical systems. In recent years, multi-physics and multi-scale problems have become a particular focus of applied mathematical research. A numerical treatment of such problems is usually very time consuming and thus requires the development of efficient discretization schemes that are often realized on large parallel computing environments. In addition, these problems often need to be solved repeatedly for many varying parameters, introducing a curse of dimensionality when the solution is also viewed as a function of these parameters. Examples for such situations include design, control, optimization, inverse problems, uncertainty analysis and statistical sampling.

In recent years there has been a tremendous effort in developing efficient model reduction-approaches and approximation methods to deal with such problems. Particular promising approaches to cope with such scenarios are Reduced Basis Methods, Proper Orthogonal Decomposition, Low Rank Tensor Approximation, Kernel Methods and Randomization Techniques. The seminar will introduce these approaches both from a theoretical and numerical perspective.

The seminar takes place at the Mathematical Research and Conference Center of the Institute of Mathematics of the Polish Academy of Sciences in Będlewo. Please see the website of the center where you can find basic information (location, travel etc.): **www.impan.pl/en/activities/bedlewo-conference-center/about-center**. In general, travel expenses can not be reimbursed. The number of participants is restricted to about 30 persons.

**Applications including**

- full name and address, incl. e-mail address
- short CV and publication list
- present position, university
- name of supervisor of Ph.D. thesis
- a short summary of previous work and interest
- title, ID and date of the intended seminar

should be sent preferably by e-mail (with attachments in pdf format) via **seminars@mfo.de** until 1 August 2020 to:

Mathematisches Forschungsinstitut Oberwolfach
Vice Director
Schwarzwaldstr. 9 – 11
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Practical questions (visa etc.) of approved applicants can be checked with the Banach Center via **office@impan.pl**.