

## Automation of Computational Modeling

The main objective of the course is to provide theoretical background as well as practical examples for automatic generation of finite element codes. Participants will get insight into symbolic description of computational models with symbolic code generator AceGen ([www.fgg.uni-lj.si/symech/](http://www.fgg.uni-lj.si/symech/)) and implementation in the finite element environment AceFEM. The course will consist of two 1.5-hour lectures.

### Lecture 1: 9.00-10.30

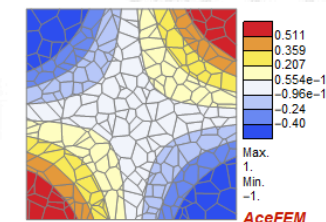
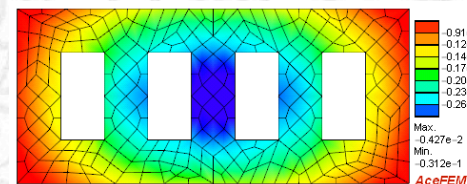
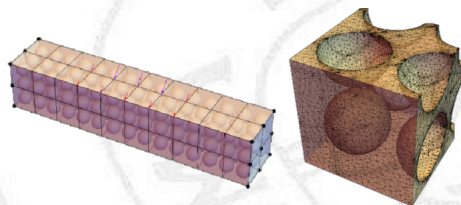
The first lecture will address the broad area of advanced software technologies for scientific computing. It will be demonstrated that an efficient automation can be achieved using the automatic differentiation technique combined with the symbolic problem description, automatic code generation and code optimization.

- Introduction
- Advanced code optimization
- Run-time generation of numerical codes with AceShare
- Sensitivity analysis

### Lecture 2: 11.00-12.30

The second lecture will address advanced topics in automation of numerical modelling with the focus on the latest advances and techniques implemented in AceFEM and AceGen.

- Implementation of  $Fe^2$  and MIEL multi-scale analysis algorithms
- Stochastic analysis
- Meshing and re-meshing with AceFEM applied to VEM and simulation of additive technologies



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**May 23<sup>rd</sup>, 09:00am (sharp)**  
**DICAr MS1 Meeting Room**  
Via Ferrata, 3 – Pavia