Elitenetzwerk Bayern

UNIVERSITÄT BAYREUTH

Lecture Series as part of the elite degree programme Scientific Computing

Date: 15.01.2020 | Time: 4:30 pm | Location: H31, Building FAN B

Coffee/tea from 4:00 pm in front of the S106, FAN B

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Space-time finite element methods

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Abstract: For the numerical solution of time-dependent problems we formulate and analyse space-time finite element methods which are formulated with respect to an admissible decomposition of the space-time domain. This allows for adaptive refinements simultaneously in space and time, and for a parallel solution in space and time.
For parabolic evolution equations we first consider space-time formulations in Bochner spaces where we discuss related stability conditions and error estimates. Then we consider variational formulations in anisotropic Sobolev spaces which turn out to be coercive also in the discrete setting.
The latter approach can be used also for hyperbolic problems such as the acoustic wave equation. We dicsuss related stability and error estimates.
An application of space-time finite element methods are optimal control problems subject to time dependent partial differential equations as constraint. In addition to the optimality condition the optimality system involves the primal problem and the adjoint problem which is backward in time.
This talk summarizes joint work with M. Zank, D. Pacheco, H. Yang, U. Langer, and F. Tröltzsch.

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