



## Mathematisches Kolloquium

Am Freitag, dem 18. Juni 2021, spricht um 14 Uhr c.t. via [Zoom](#)

Univ. Prof. Dr. Olaf Steinbach  
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über das Thema:

### Space-time discretization methods

*Abstract:*

For the numerical solution of time-dependent partial differential equations we apply space-time discretization methods which are based on a variational formulation in the space-time domain. This approach allows an adaptive resolution of the solution in space and time simultaneously, and parallelization in space and time for an efficient iterative solution.

We first discuss a standard space-time variational formulation in Bochner spaces, with applications to the solution of distributed optimal control and inverse problems, subject to the heat equation. More recent work is on time-varying computational domains in order to do a shape optimization of electrical machines.

An alternative approach is a space-time variational formulation in anisotropic Sobolev spaces, where we use a modified Hilbert transformation to end up with a stable scheme in the space-time domain. This approach also allows to consider the acoustic wave equation, where we present first results for an unconditionally stable space-time finite element method, and new coercivity estimates for related space-time boundary element methods.

The talk is based on joint work with U. Langer (Linz), F. Tröltzsch (Berlin), H. Yang (Korneuburg), P. Gangl, (Graz), M. Gobrial (Graz), M. Zank (Wien), C. Urzua-Torres (Delft), and R. Löscher (Darmstadt).

Der Gast wird von Prof. Dr.Sergej Rjasanow betreut.

Alle Interessenten sind zum Vortrag herzlich eingeladen.

**Die Dozenten der Mathematik**