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Einladung zur öffentlichen Defensio von

Alexander Pichler

Thema der Dissertation:

Virtual element methods for problems in acoustics and fluid dynamics

Abstract:
"The thesis deals with the design and analysis of virtual element methods (VEM) for problems in acoustics and fluid dynamics. By an implicit definition of the basis functions and suitable projectors onto spaces of known functions, such as polynomials or plane waves, VEM are capable of coping with general polytopal meshes and thus provide more freedom in mesh generation in comparison to standard finite element methods. As acoustic model problem, the Helmholtz problem is considered. For this problem, a VEM is introduced that additionally fulfills the Trefftz property, i.e. the employed basis functions belong to the kernel of the Helmholtz operator. This feature allows to reach a given accuracy with significantly less degrees of freedom than with standard (non-Trefftz) methods. Concerning the fluid dynamics model problem, the miscible displacement of incompressible fluids in porous media is considered. This problem can be formulated by a nonlinear coupling of a parabolic diffusion-convection-reaction type equation with a mixed system. A semidiscrete and a fully discrete formulation of this problem in the VE context are studied. For both kind of problems, theoretical and numerical aspects are discussed."

Prüfungssenat:

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