Institut für
Angewandte Mathematik

Leibniz
Universität
Hannover

Vortragsankündigung

Dr. Peter Gangl

Johann Radon Institute of Computational
and Applied Mathematics (RICAM), Linz

SPACE-TIME SHAPE OPTIMIZATION OF ROTATING ELECTRIC MACHINES

Electric machines can often be modeled by the magneto-quasi-static approximation of Maxwell's equations in two space dimensions. We consider the simulation of a rotating electric machine by means of a space-time finite element method where the rotation is captured by the tetrahedral space-time mesh. We derive the shape derivative for a given cost function with respect to a perturbation of the (spatial) geometry and present a shape optimization algorithm for moving domains in space-time. Here, it is important to note that the optimized geometry is moving, but must not change its shape over time. Finally, for a realistic simulation, the initial condition of the evolution problem at hand is obtained as the solution to a static PDE on the given geometry and, thus, is shape-dependent as well. Accounting for this aspect yields a shape optimization problem that is constrained by a system of a static and a transient PDE. We show an extension of our sensitivity analysis and shape optimization algorithm to this setting and present numerical results for the optimization of a synchronous reluctance machine.

Donnerstag 21.04.2022 14:15 Uhr Raum C311

Hauptgebäude der Universität
Welfengarten 1, 30167 Hannover

Alle Interessierten sind herzlich eingeladen.