Kolloquium Angewandte Mathematik
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der Bundeswehr
Universität München

Vortragsankündigung

Am Freitag**, den 18.08.2017,** hält **um 10:00 Uhr**

Edwin Mai
(UniBw)

einen Vortrag über das Thema

A Reduced SQP Method for Stokes Optimal Shape Design

Der Vortrag findet im **Raum 1401** in **Gebäude 33** statt.

Vortragszusammenfassung

The presentation considers a Stokes optimal shape design task which is a PDE constrained optimal control problem with the control being the domain of the underlying problem itself. The problem is addressed in an optimise-then-discretise approach which involves usage of an analytical shape derivative, i.e. a certain Gâteaux derivative in the direction of a domain variation. In general, the shape derivative can be utilised in a line search method to find the optimal shape for the problem. Usually those line search procedures only show a slow convergence behaviour, which especially in shape optimisation is very cost expensive. Improvement of the optimisation procedure can be achieved by using second order information. Therefore, the analytic Shape Hessian formulation and its integration into an SQP framework will be presented. Since this type of problem only involves equality constraints the solution of the KKT System is within the kernel of the PDE constraint. Hence solving the Stokes equations exactly allows to define a reduced SQP method. Unfortunately, the structure of the Shape Hessian prohibits to use a direct solution of the KKT System which results in the need to use an iterative algorithm instead. This can be considered as a reverse step, i.e. an adjoint forward model is used to derive the shape derivative, whereas for the reverse Hessian model only the impact in a certain direction is known. After discussing the theoretical background the numerical application and results on a Stokes channel flow will be shown.

Alle Interessierten sind dazu herzlich eingeladen.