



Institut für
Angewandte Mathematik



Leibniz
Universität
Hannover

Institut für Angewandte Mathematik
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Vortragsankündigung

**Dr. Andreas Potschka
(Universität Heidelberg)**

Backward step control globalization for nonlinear problems in function space

We propose a novel step size selection method for the globalization of convergence of Newton-type methods for nonlinear root finding problems and its generalization to a Hilbert space setting. The advantages of the globalization strategy comprise a simple yet efficient implementation and a rigorous convergence analysis based on generalized Newton paths. Under reasonable assumptions, the results of the convergence analysis include full steps in the vicinity of a solution, a uniform lower step size bound, a priori guarantees for the nonlinear decrease of the residual norm, and convergence to a distinguished root, namely the end point of the generalized Newton path emanating from the initial guess. In addition, the framework delivers suitable relative termination tolerances for inexact residual minimizing Krylov--Newton methods and can be utilized to derive general purpose adaptive grid refinement strategies for finite element discretizations of PDE problems. We conclude the talk with numerical results for the unconstrained optimization problems of the CUTEst test set and for the minimal surface PDE.

**Dienstag, 27. September 2016, 10:00 Uhr, Raum c311
Hauptgebäude der Universität**