

# **Design und Konvergenz eines adaptiven Finite Elemente Algorithmus für zeitabhängige Probleme**

Abstract:

We consider the so-called heat equation, which is the prototype for parabolic partial differential equations. These time dependent equations arise in various applications and need to be solved efficiently.

In this talk, we introduce a space-time-adaptive version of the well-known Euler-Galerkin discretization employing finite elements in space and a one-step-scheme in time. An a posteriori error estimate gives reliable and efficient error control and on the other hand provides local space and time error indicators which can be used for driving the adaptive procedure. Hence, those error indicators are at the core of the algorithm and determine its behavior. To answer any questions regarding convergence, the space and time error indicators have to be analyzed.

We focus on the time error indicator and derive a minimal time step size which is sufficient for reaching a desired tolerance. Finally, we compare this theoretical minimal time step size with numerical experiments.