

# Einladung zum Würzburger Mathematischen Kolloquium

Julius-Maximilians-Universität Würzburg • Fakultät für Mathematik und Informatik

Prof. Dr. Christian Lubich

Eberhard-Karls-Universität Tübingen

## Stable Numerical Coupling of Interior and Exterior Problems for the Wave Equation

Mittwoch, den 24. April 2013 • 16:15 Uhr

Mathematik Ost (Emil-Fischer-Straße 40), Seminarraum SE 40 (Raum 00.001)

### Inhaltsangabe

The acoustic wave equation on the whole three-dimensional space is considered with initial data and inhomogeneity having support in a bounded domain, which need not be convex. We propose and study a numerical method that approximates the solution using computations only in the interior domain and on its boundary. The transmission conditions between the interior and exterior domain are imposed by a time-dependent boundary integral equation coupled to the wave equation in the interior domain. We give a full discretization by finite elements and leapfrog time-stepping in the interior, and by boundary elements and convolution quadrature on the boundary. The direct coupling becomes stable on adding a stabilization term on the boundary. The derivation of stability estimates is based on a strong positivity property of the Calderon boundary operators for the Helmholtz and wave equations and uses energy estimates both in time and frequency domain. The stability estimates together with bounds of the consistency error yield optimal-order error bounds of the full discretization. The talk is based on joint work with Lehel Banjai and Francisco-Javier Sayas.



[www.mathematik.uni-wuerzburg.de/kolloquium.html](http://www.mathematik.uni-wuerzburg.de/kolloquium.html)

Zu diesem Vortrag laden wir Sie herzlich ein.  
Im Anschluss an die Vorträge Kaffee und Tee im Foyer vor dem SE 40.

Die Dozentinnen und Dozenten der Mathematik

