MATHEMATISCHES KOLLOQUIUM

UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

Prof. Dr. Martin Vohralík

INRIA de Paris

" **Guaranteed and robust a posteriori bounds for Laplace eigenvalues and eigenvectors** "

Joint work with E. Cances, G. Dusson, Y. Maday, and B. Stamm

We derive a posteriori error estimates for numerical approximation of the Laplace eigenvalue problem with a homogeneous Dirichlet boundary condition. In particular, upper and lower bounds for an arbitrary simple eigenvalue are given. These bounds are guaranteed, fully computable, and converge with optimal speed to the given exact eigenvalue, under a separation condition from the surrounding smaller and larger exact eigenvalues that we can check in practice. Guaranteed, fully computable, optimally convergent, and polynomial-degree robust bounds on the energy error in the approximation of the associated eigenvector are derived as well, under the same hypotheses. Remarkably, there appears no unknown (solution-, regularity-, or polynomial-degree-dependent) constant in our theory. Inexact algebraic solvers are taken into account; so that the estimates are valid on each iteration and can serve for design of adaptive stopping criteria for eigenvalue solvers. The framework can be applied to conforming, nonconforming, discontinuous Galerkin, and mixed finite element approximations of arbitrary polynomial degree. We illustrate it numerically on a set of test problems.

Ort: Universität Duisburg-Essen, Fakultät für Mathematik, Thea-Leymann-Str. 9, 45127 Essen, Raum WSC-S-U-4.02

Zeit: Mittwoch, 14. Dezember 2016 um 17:15 Uhr

Vor dem Vortrag gibt es ab 16:45 Uhr Gelegenheit zum Gespräch bei Kaffee und Tee in Raum WSC-S-4.05.

Die Dozenten der Mathematik