Seminar:

Luka Grubišić, PMF-MO, University of Zagreb, Zagreb, Croatia:

Kato's square root theorem as a basis for relative estimation theory of eigenvalue approximations

We present new residual estimates based on Kato's square root theorem for spectral approximations of diagonalizable non-self-adjoint differential operators of diffusion-convection-reaction type. These estimates are incorporated as part of an hp-adaptive finite element algorithm for practical spectral computations. We present a posteriori error estimates both for eigenvalues as well as eigenfunctions and prove that they are reliable. We demonstrate the efficiency of the proposed approach on a collection of benchmark examples.