

FINITE ELEMENTS FOR ELLIPTIC EIGENVALUE PROBLEMS IN THE PREASYMPTOTIC REGIME

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ABSTRACT

Convergence rates for finite element discretisations of elliptic eigenvalue problems in the literature usually are of the form: If the mesh width h is fine enough then the eigenvalues resp. eigenfunctions converge at some well-defined rate. In our talk, we will analyse the maximal mesh width h_0 - more precisely the minimal dimension of a finite element space - so that the asymptotic convergence estimates hold for $h < h_0$. This mesh width will depend on the size and spacing of the exact eigenvalues, the spatial dimension and the local polynomial degree of the finite element space. We will show the results of some numerical experiments concerning

- a) the convergence of the eigenfunctions and λ -values,
- b) the convergence of the eigenvalue multigrid method to investigate the sharpness of the theoretical results.