1038-65-74   **Jeffrey S Ovall*** (`jovall@acm.caltech.edu`), Jeffrey S. Ovall, California Institute of Technolgy, Mail Code 217-50, Pasadena, CA 91125-0124. *Efficient and reliable error estimation for elliptic eigenvalue problems.*

Using the 2D Dirichlet Laplacian on (possibly) non-convex domains as a model problem, we consider the efficient and reliable assessment of finite element approximations of clusters of eigenvalues and their associated invariant subspaces. These clusters may contain repeated eigenvalues. Using the weakest possible regularity assumptions, we prove the equivalence of our estimator and the true discretization error, and give a partial explanation of why we generally see asymptotic equivalence of the estimate and actual error in practice. Numerical experiments demonstrate the effectiveness of the procedure even on coarse meshes. (Received January 29, 2008)