1071-65-105 **Jeffrey Ovall*** (jovall@ms.uky.edu), Patterson Office Tower 761, Department of Mathematics, University of Kentucky, Lexington, KY 40506, and **Randolph Bank** and **Luka Grubisic**. *A framework for robust eigenvalue error estimation and ritz value convergence enhancement.*

We present a general framework for the a posteriori estimation and enhancement of error in eigenvalue/eigenvector computations for symmetric and elliptic eigenvalue problems, and provide detailed analysis of a specific and important example within this framework—finite element methods with continuous, affine elements. A distinguishing feature of the proposed approach is that it provides provably efficient and reliable error estimation under very realistic assumptions, not only for single, simple eigenvalues, but also for clusters which may contain degenerate eigenvalues. We reduce the study of the eigenvalue/eigenvector error estimators to the study of associated boundary value problems, and make use of the wealth of knowledge available for such problems. Our choice of *a posteriori* error estimator, computed using hierarchical bases, very naturally offers a means not only for estimating error in eigenvalue/eigenvector computations, but also cheaply accelerating the convergence of these computations—sometimes with convergence rates which are nearly twice that of the unaccelerated approximations. (Received February 25, 2011)