1086-65-2287 **Jeffrey S Ovall*** (jovall@ms.uky.edu), Lexington, KY 40506, and **Hengguang Li** (hli@math.wayne.edu), Detroit, MI. *A posteriori estimation of hierarchical type for the Schrödinger operator with inverse square potential on graded meshes.*

We develop an *a posteriori* error estimate for mixed boundary value problems of the form $(-\Delta + V)u = f$, where the potential V may possess inverse-square singularities at finitely many points in the domain. We prove that our error estimate can be efficiently computed and is equivalent to the actual error in the energy norm on a family of geometrically graded meshes appropriate for singular solutions of such problems. Therefore, our estimate can be used for a practical stopping criterion. A variety of numerical experiments support our theoretical results. We also offer a direct convergence and effectivity comparison between the geometrically-graded meshes, which are based on *a priori* knowledge of possible singularities in the solution, and adaptively refined meshes driven by local error indicators associated with our *a posteriori* error estimate. (Received September 25, 2012)