

A POSTERIORI ERROR ESTIMATORS FOR WEIGHTED NORMS. ADAPTIVITY FOR POINT
SOURCES AND LOCAL ERRORS

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We develop a posteriori error estimates for general second order elliptic problems with point sources in two- and three-dimensional domains. We prove a global upper bound and a local lower bound for the error measured in a weighted Sobolev space. The weight belongs to the Muckenhoupt's class A_2 . The purpose of the weight is twofold. On the one hand it weakens the norm around the singularity, and on the other hand it strengthens the norm in a region of interest, to obtain localized estimates. The theory hinges on local approximation properties of either Clement or Scott-Zhang interpolation operators, without need of suitable modifications, and makes use of weighted estimates for fractional integrals and maximal functions. Numerical experiments illustrate the excellent performance of an adaptive algorithm with the obtained error estimators.