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Arezou Ghesmati* (aghesmati@math.tamu.edu), Department of Mathematics Mailstop 3368, Texas A&M University, College Station, TX 77843-3368, and **Wolfgang Bangerth** (bangerth@math.tamu.edu), Department of Mathematics Mailstop 3368, Texas A&M University, College Station, TX 77843-3368. *A Residual Based A posteriori Error Estimation in a Fully Automatic hp-FEM for The 2 and 3-D Stokes Model Problem.*

A posteriori error estimator as a computable quantity in terms of known quantities such as approximated solution and the data, gives a useful tool to assess the approximation quality in order to improve the solution adaptively. In this research we present a fully automatic hp-adaptive refinement strategy for Finite Element Method, using a residual based a posteriori error estimation which is based on the solution and the data of local boundary value problems. The reliability and also the efficiency for this introduced estimator has been proved. Moreover the contraction convergence is shown and verified in theoretical part. Our results out of implementation for Stokes problem indicates the exponential rate of convergence in our hp-adaptive algorithm. (Received August 13, 2014)