

1116-65-180

Arezou Ghesmati* (aghesmati@math.tamu.edu), 1201 Harvey Rd, Apt #80, College Station, TX 77840, **Bruno Turcksin** (turcksin@math.tamu.edu), Department of Mathematics, Mailstop 3368, Texas A&M University, Bloc. 507E, 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 hp-adaptive FEM for the Stokes Equations.*

In this research we derive a residual based a posteriori error estimation for the hp- Adaptive Finite Element Method (hp-AFEM) for the steady state Stokes problem which describe slow motion of an incompressible fluid. The error estimator is obtained by extending the idea of a posteriori error estimator for the classical h-version of AFEM. The reliability and also the efficiency of the introduced error estimator are established. Moreover, we have proved that our hp-adaptive FEM method is a contraction both in energy error and also in quasi-error. The numerical experiments show the performance of the introduced adaptive hp-FEM algorithm using the proposed a posteriori error estimator. (Received August 11, 2015)