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Arezou Ghesmati* (aghesmati@math.tamu.edu), 1201 Harvey Rd, Apt #80, College Station, TX 77840, **Bruno Turcksin** (turcksin@math.tamu.edu), Department of Mathematics, Blocker 507E, Texas A&M University, College Station, TX 77843, and **Wolfgang Bangerth** (bangerh@math.tamu.edu), Department of Mathematics, Mailstop 3368, Texas A&M University, College Station, TX 77843-3368. *Goal-Oriented A Posteriori Error Estimation for Saddle Point Problem in hp Adaptive FEM.*

In this research we introduce a new approach on goal-oriented a posteriori error estimation for an automatic *hp*-Adaptive Finite Element Method. The presented method is based on the classical dual-weighted algorithm. The proposed goal-oriented error estimation requires the solution of local dual problems on patches. The idea of having local patch problems is to apply Clément and Scott–Zhang type interpolation operators to estimate point values with the finite element polynomials. The reliability and also the efficiency of the proposed estimation which are the upper and the lower bounds of functional error, have been proved. The performance of the proposed goal-oriented a posteriori estimator for both *h*- and *hp*-Adaptive FEM has been investigated on numerical examples. (Received August 11, 2015)