1106-65-313 **JaEun Ku*** (jku@math.okstate.edu), 401 Mathematical Sceinces, Mathematics, Oklahoma State University, Stillwater, OK 74074. *Efficient two–step hybrid mixed finite element methods.*

A new hybrid mixed finite element method to compute the flux variable accurately and efficiently will be introduced. The method is a two—step method, based on a system of first-order equations for second-order elliptic partial differential equations. On a coarse mesh, the primary variable is approximated by a standard Galerkin method. Then, on a fine mesh, an H(div) projection is sought as an accurate approximation for the flux variable. The computation on a finer mesh can be carried out very efficiently using well developed preconditioners for the H(div) projection. Also, it will be shown that the mesh size h for the finer mesh can be taken as the square of the coarse mesh size H, or a higher order power with a proper choice of parameter. This means that the computational cost for the coarse-grid solution is negligible compared to that for the fine-grid solution. This is a joint work with Dr. Young Ju Lee and Dr. Dongwoo Sheen. (Received August 21, 2014)