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Zicong Zhou* (zicong.zhou@uta.edu), 411 S. Nedderman Drive, 478 Pickard Hall, Arlington, TX 76019-04, and **Guojun Liao**. *A Novel Deformation Method for Higher Order Mesh Generation*.

In [G.Liao et.al, Adaptive Grid Generation based on the Least Square Finite Element Method(LSFEM)], the prescribed positive Jacobian determinant is essential and a LSFEM had built to solve the Div-Curl system that appears in Liao's deformation method for mesh generation. In this work, similarly to [G.Liao et.al, A New Method for Triangular Mesh Generation], this method is extended to generate higher order mesh by an adaptive moving mesh technique. Numerical examples for $p=3$ will be shown to demonstrate the procedures and its effectiveness. The applications in image registration will also be discussed, as presented in [X.Chen et.al, New Variational Method of Grid Generation with prescribed Jacobian determinant and prescribed curl] and [X.Chen et.al, New method of averaging diffeomorphisms based on Jacobian determinant and curl vector]. (Received July 18, 2017)