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Fatih Celiker* (celiker@math.wayne.edu), 656 W. Kirby 1150 FAB, Detroit, MI 48202, and
Alexander Ten Eyck and **Adrian Lew**. *Adaptive stabilization of discontinuous Galerkin
methods for nonlinear elasticity.*

We introduce a novel approach to stabilizing discontinuous Galerkin methods in nonlinear elasticity problems. The new stabilization strategy possesses the distinguishing feature of allowing the size of the stabilization term to vary throughout the mesh, and automatically adjusting the local level of stabilization according to the solution sought. This stabilization strategy is hence adaptive. The proposed scheme is computationally efficient and remains stable for a fairly lengthy quasistatic loading path. This is demonstrated with two and three dimensional numerical examples. We further propose a slight modification of this approach for which we are able to prove theoretical estimates for the minimal values of the stabilization parameters defining the method. (Received January 29, 2008)