

1106-74-150

**Tina Mai\*** ([mai@math.tamu.edu](mailto:mai@math.tamu.edu)), Department of Mathematics, Mailstop 3368, Texas A&M University, College Station, TX 77843-3368, and **Jay R. Walton** ([jwalton@math.tamu.edu](mailto:jwalton@math.tamu.edu)). *On Monotonicity for Strain-Limiting Theories of Elasticity.*

This presentation addresses certain notions of convexity for strain-limiting theories of elasticity in which the Green-St.Venant strain tensor is written as a nonlinear response function of the second Piola-Kirchhoff stress tensor. Previous results on strong ellipticity for special strain-limiting theories of elasticity required invertibility of the Fréchet derivative of the response function as a fourth-order tensor. The present contribution generalizes the theory to cases in which the Fréchet derivative of the response function is not invertible, by studying a weaker rank-1 convexity notion, monotonicity, applied to a general class of nonlinear strain-limiting models. It is shown that the generalized monotonicity holds for Green-St.Venant strains with sufficiently small norms, and fails (through demonstration by counterexample) when the small strain constraint is relaxed. (Received July 29, 2014)