Weak local minimizers in finite elasticity

Gianpietro Del Piero, Raffaella Rizzoni

Department of Engineering, University of Ferrara



э

<≣⇒

- Vanishing of the first variation \rightarrow equilibrium configurations
- Non-negativeness of the second variation \rightarrow infinitesimally stable configurations
- \bullet Vanishing of the first variation and the uniform positiveness of the second variation \to safe configurations
- *Minimizing path*: the portion of the given equilibrium path made of weak local energy minimizers.
 - $\bullet\,$ An infinitesimally stable path \to approximations of the minimizing path from the exterior
 - $\bullet\,$ An safe path \to approximations of the minimizing path from the interior
- The purpose of this work is to render these approximations as close as possible.
 - ◊ Holden, ARMA 1964
 - ◊ Beatty, J. El. 1971
 - ◊ Gurtin and Spector, ARMA 1979
 - ◊ Spector, ARMA 1984



< 注 > < 注 >

Stretching of a compressible isotropic cylinder made of a Blatz-Ko material



Gianpietro Del Piero, Raffaella Rizzoni Weak local minimizers in finite elasticity

- Torsion of circular isotropic incompressible cylinder made of a material with nonconvex energy density. Rivlin's fundamental solution is a candidate for a weak local energy minimizer for small values of the angle of twist. Partial results:
 - ♦ Fosdick e Zhang, 1993
 - ◊ Del Piero e R., 1997
- Characterization of materials showing absence of bifurcation in tension. Noticed by several authors under various constitutive assumptions:
 - Wesołowski, 1962
 - Cheng, Ariaratnam and Dubey, 1971
 - Beatty, 1971
 - Spector, 1984



э

글 > : < 글 >