1000-49-51   **Mikil Foss*** (`foss@math.ksu.edu`), Mathematics Department, 138 Cardwell Hall, Manhattan, KS 66502-2602. *Conditions sufficient for partial regularity of a minimzer in nonlinear elasticity.*

   Given a body of elastic material, a basic problem in elastostatics is to find a deformation of this body that displaces the body's surface in some prescribed manner and minimizes a given energy functional. To preclude, as possible minimizers, those deformations that reverse the orientation of the material in a part of the body or compress a part to a region with zero volume, it is physically reasonable that the functional be equal to infinity for these types of deformations. In this talk, I will present conditions on a minimizer of physically reasonable energy functionals that are sufficient for ensuring its partial regularity. In two dimensions, with $\Omega \subset \mathbb{R}^2$ and $p > 8$, the prototypical functional considered is

$$\int_{\Omega} \left\{ \|\nabla \mathbf{u}\|^p + h(\det \nabla \mathbf{u}) \right\} d\mathbf{x},$$

where

$$h(\delta) := \begin{cases} \delta^{-2}, & \delta > 0; \\ +\infty, & \delta \leq 0. \end{cases}$$

Among the results to be presented is that any bilipschitz minimizer for this functional is partially regular. (Received August 08, 2004)

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