

Symmetry of energy minimising equilibria in nonlinear elasticity

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In nonlinear elasticity, one associates a stored energy with each possible deformation of a given elastic body. One approach to proving the existence of equilibrium states for the body is to then prove the existence of (global or local) energy-minimising deformations that satisfy the imposed boundary conditions. There is now a well-developed existence theory (originating in work of C.B. Morrey and J.M. Ball) for global energy minimisers which uses the direct method of the Calculus of Variations. However, there are surprisingly few situations in which these minimisers are known to be smooth. (One such example is due to K. Zhang for equilibrium states close to the identity.)

In this talk we present new vector-symmetrisation arguments for cylindrical and annular domains, which yield hypotheses under which symmetric boundary conditions give rise to smooth symmetric energy minimisers.

This work is joint with Scott J. Spector (S.Illinois).