

Talk announcement

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Existence Theory in Nonlinear Hyperelasticity

Hyperelasticity provides a mathematical framework for modeling elastic bodies undergoing large deformations. In contrast to linear elasticity, the governing equations are highly nonlinear and are naturally formulated as a variational problem in terms of a stored-energy functional. In this talk, we give a brief introduction to the kinematics of finite deformations as well as the notions of stress and force in continuum mechanics. We then formulate the equilibrium problem as the minimization of a nonlinear energy functional and discuss the existence of a variational solution. During the discussion we motivate the notion of polyconvexity introduced by John M. Ball. This leads to a classical existence result obtained via the direct method of the calculus of variations.