A neohookean model of plates

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This talk is about hyperelastic deformations of plates (planar domains) which minimize a neohookean-type energy. Particularly, we investigate a stored energy functional introduced by J.M. Ball. The mappings under consideration are Sobolev homeomorphisms and their weak limits. They are monotone in the sense of C. B. Morrey. One major advantage of adopting monotone Sobolev mappings lies in the existence of the energy-minimal deformations. However, injectivity is inevitably lost, so an obvious question to ask is: what are the largest subsets of the reference configuration on which minimal deformations remain injective? The fact that such subsets have full measure should be compared with the notion of global invertibility which deals with subsets of the deformed configuration instead. In this connection we present a Cantor type construction to show that both the branch set and its image may have positive area.

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