Multiscale topology optimization for hyperelastic material

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Abstract

The present study proposes multiscale topology optimization considering hyperelastic composites for maximizing the end compliance of a macro-structure. Combination of topology optimization and multiscale analysis with material nonlinearity requests unrealistic computational efforts. We apply a decoupling multiscale analysis to remedy this problem and proposes the systematic sensitivity analysis based on the localization. It is verified from a series of numerical examples that the proposed method provides a substantial increase of objective values.