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An energetic approach to the analysis of anisotropic hyperelastic materials. (English)

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Summary: We demonstrate that for the class of anisotropic hyperelastic materials with stiffening behaviour (i.e., the stiffness increases for increasing strain), it is possible to find an approximation by means of the linear superposition of an anisotropic quadratic potential, generated by the true linear elasticity tensor of the target material, and a suitable correction potential that is isotropic and hyperelastic. The proposed method can be implemented into commercially available Finite Element software by use of featured options only. This approach is intended to provide the solution to a stress-strain problem, based entirely on energetic considerations, which ensures the convexity of the potentials, and provides a simple material characterisation procedure.

MSC:

74B20 Nonlinear elasticity
74E10 Anisotropy in solid mechanics

Cited in 10 Documents

Keywords:

anisotropy; hyperelasticity; elastic potential; convexity

Software:

ABAQUS

Full Text: [DOI](#)

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