Finite element modeling of large deformation of nonlinear-elastic materials with A_V model

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The algorithm of finite-element solving the three-dimensional problem of nonlinear elasticity theory under finite deformations has been suggested for two models: model A_V and neo-Hooke's model. This algorithm is a modification of the Bonnet method based on using the weak variational statement of the elasticity theory problem in differentials in an actual configuration. Examples of numerical solution of the problem on finite deformations of uniaxial tension of a beam in the three-dimensional statement have been given. Finite-element computations have been compared with known analytic solutions, that showed a very high accuracy of the suggested algorithm of numerical solving. Computations have been performed by the author's software including the author's realization of the Holetskiy method with using the elimination matrices for solving the linear equation systems of great dimensionality.

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