Circumferential shear for an incompressible non-Green elastic cylindrical annulus

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Abstract

The circumferential[1] shear of a nonlinear isotropic incompressible elastic annulus is studied using the neo-Hookean, Ogden constitutive relations in addition to a new constitutive relation for the Henky strain in terms of the Cauchy stress. The predictions of the three constitutive relations to the specific boundary value problem are delineated. In view of the predictions being quite distinct between the new constitutive relation studied and that for the Ogden constitutive relation, it would be worthwhile to carry out an experiment to determine the efficacy of the models.

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[1] This class of deformation is called azimuthal or torsional shear as well.