

Instability of single polymer chain in an electroelastic problem

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Abstract	Under electric loading produced by compliant electrodes, a dielectric elastomer is prone to material instabilities which, in a microstructural level, may connect to single polymer chain instability. To reveal if such connection exists, we aim to use an electroelastic energy model for single polymer chain to study the chain instability. We approximate curvature shape of the chain under the electric loading by using trigonometry series in a spatial coordinate. The Rayleigh-Ritz method is then applied to solve the energy equation formed by the trigonometry series. We demonstrate in the numerical examples that the instability of the chain may occur at the value of electric field with corresponding configuration of the chain close to its full length.
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