Melnikov Analysis for the Chaos of the Nonlocal Nanobeam Resting on Fractional-Order Softening Nonlinear Viscoelastic Foundations

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Abstract : In the present study, the dynamics of nanobeam resting on fractional order softening nonlinear viscoelastic pasternack foundations is studied. The Hamilton principle is used to derive the nonlinear equation of the motion. Approximate analytical solution is obtained by applying the standard averaging method. The Melnikov method is used to investigate the chaotic behaviors of device, the critical curve separating the chaotic and non-chaotic regions are found. It is shown that appearance of chaos in the system depends strongly on the fractional order parameter.

Keywords : chaos, fractional-order, Melnikov method, nanobeam
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