Parametrically excited microcantilever beam under large deflection and mass sensing

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Abstract

Dynamic analysis of feedback-based parametric instability in microcantilever beam with the consideration of microsize effect has been carried out. The effect of nonlinearities caused by large deflection and feedback has also been considered. Multiple scales scheme has been utilized for the study, and the outcomes have been verified using generalized differential quadrature method and Galerkin approach. Parametric instability has been realized as a valuable phenomenon for mass detection. Here, a method of mass sensing has been presented, which is based on determining the change in the amplitude. The method has been demonstrated through parametric resonance in the first and second