



## DYNAMIC STABILITY ANALYSIS OF FUNCTIONALLY GRADED MATERIAL BEAMS

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Volume: XII

No: 3

Pages: 95-106

Date: July 2015

### Abstract:

Dynamic stability analysis of beams composed of functionally graded material, with a focus on the effective modelling of material properties, is considered for the study presented in this paper. A new, innovative and practical state function is defined for modelling the grading of material properties and used in deriving the governing equations. This function provided the opportunity to accurately and effectively model gradation of material properties with the property-rich conditions on two faces of the beam, and the smooth grading through its height. The governing equation was derived and an analytical solution is proposed. It is shown that the unified solution may be used for homogeneous and functionally graded materials. The dynamic stability interaction diagram for a cantilever beam under axial and follower forces are analysed and used as a verification of the presented work.

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