

FREE VIBRATIONS OF AN AXIALLY FUNCTIONALLY GRADED BEAM WITH A CONCENTRATED MASS

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ABSTRACT

The free transverse vibrations of axially functionally graded (AFG) cantilever beams with a concentrated mass at the free end are studied in this paper. The material properties of the AFG beam, consisting of metal and ceramic, vary continuously in the axial direction according to a power-law form. Approximated solutions for the title problem are obtained by means of two different approaches: Differential Quadrature Method (DQM) and the Ritz Method.

The influence of the material variation on the natural frequencies of vibration of the functionally graded beam is investigated. The phenomenon of dynamic stiffening of beams can be observed in various situations.

Through results available in the literature that can be represented by the model under study, the accuracy of the procedure is verified and a comparison between the approximate methods is performed.

REFERENCES

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