

عنوان مقاله:

Vibration Analysis of Multi-Step Bernoulli-Euler and Timoshenko Beams Carrying Concentrated Masses

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خلاصه مقاله:

In this paper, vibration analysis of multiple-stepped Bernoulli-Euler and Timoshenko beams carrying point masses is presented analytically for various boundary conditions. Each attached element is considered to have both translational and rotational inertias. The method of solution is "transfer matrix method" which is based on the changes in the vibration modes at the vicinity of any discontinuity in geometrical and natural parameters; these changes are shown by transfer matrices depended on the geometry of each step or value of the translational and rotational inertias of each attached element. First, natural frequencies and corresponding normal mode shapes are obtained by implementation of the compatibility conditions and external boundary conditions; Then, the precision of the proposed method is checked by comparison of the results with other exact solutions; Finally, the effect of the translational and rotational inertias and position of the attached elements on the natural frequencies of multi-stepped beams are investigated for various boundary conditions.

کلمات کلیدی:

Bernoulli-Euler beam, Timoshenko beam, Multi-Step beam, Concentrated mass, Rotary inertia

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