

عنوان مقاله:

Exact Closed-Form Solution for Vibration Analysis of Truncated Conical and Tapered Beams Carrying Multiple Concentrated Masses

محل انتشار:

فصلنامه مکانیک جامد، دوره 9، شماره 4 (سال: 1396)

تعداد صفحات اصل مقاله: 23

نویسندگان:

K Torabi - *Department Mechanical Engineering, Faculty of Engineering, University of Isfahan, Isfahan, Iran*

H Afshari - *Department of Mechanical Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Isfahan, Iran*

M Sadeghi - *Department of Solid Mechanics, Faculty of Mechanical Engineering, University of Kashan, Kashan, Iran*

H Toghian - *Department of Mechanical Engineering, Islamic Azad University, Najafabad Branch, Najafabad, Iran*

خلاصه مقاله:

In this paper, an exact closed-form solution is presented for free vibration analysis of Euler-Bernoulli conical and tapered beams carrying any desired number of attached masses. The concentrated masses are modeled by Dirac's delta functions which creates no need for implementation of compatibility conditions. The proposed technique explicitly provides frequency equation and corresponding mode as functions with only two integration constants which leads to solution of a two by two eigenvalue problem for any number of attached masses. Using Basic functions which are made of the appropriate linear composition of Bessel functions leads to make implementation of boundary conditions much easier. The proposed technique is employed to study effect of quantity, position and translational inertia of the concentrated masses on the natural frequencies and corresponding modes of conical and tapered beams for all standard boundary conditions. Unlike many of previous exact approaches, presented solution has no limitation in number of concentrated masses. In other words, by increase in number of attached masses, there is no considerable increase in computational effort.

کلمات کلیدی:

Exact solution, Transverse vibration, Concentrated mass, Conical beam, Tapered beam

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/999339>

