عنوان مقاله:

Investigation of surface and nonlocal effects in the vibration of massattached nanotubes by Differential transform method

محل انتشار:

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خلاصه مقاله:

In this paper nonlocal Euler–Bernoulli beam theory is employed for vibration nanotubes that carrying a spherical nanoscale object at the free end with considering surface effect by using semi analytical differential transform method (DTM). The nonlocal Eringen theory takes into account the effect of small size, which enables the present model to become effective in the analysis and design of nanosensors and nanoactuators. Governing equations are derived through Hamilton's principle and they are solved applying differential transform method (DTM). The good agreement between the results of this article and those available in literature validated the presented approach. The detailed mathematical derivations are presented and numerical investigations are performed while the emphasis is placed on investigating the effect of several nanotube parameters such as size effects, mode number, surface effect and attach mass on normalized natural frequencies and mode shapes of nanotube in detail. It is concluded that these effects play significant role on dynamic behavior of nanotube. Numerical results are presented to serve as benchmarks for future analyses of such nanotubes.

کلمات کلیدی:

Nanotube, Nonlocal elasticity, Differential transformation method, surface effect

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