

عنوان مقاله:

Vibration Analysis of Rectangular Kirchhoff Nano-Plate using Modified Couple Stress Theory and Navier Solution Method

محل انتشار:

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خلاصه مقاله:

In this study, the characteristics of rectangular Kirchhoff nano-plate vibrations are investigated using a modified couple stress theory. To consider the effects of small-scale, the modified couple stress theory proposed by Young (۲۰۰۲) is used as it has only one length scale parameter. In modified couple stress theory, the strain energy density is a function of the components of the strain tensor, curvature tensor, stress tensor, and symmetric part of the couple stress tensor. After obtaining the strain energy, external work, and kinetic energy equation and inserting them in the Hamilton principle, the main and auxiliary equations of nano-plate are obtained. Then, by applying the boundary and force conditions in the governing equations, the vibrations of the rectangular Kirschhof nano-plate with the thickness are investigated with simple support around. The solution method used in this study is the Navier method and the effects of material length scale, length and thickness of the nanoplate on the vibration are investigated and the results are presented and discussed in details.

کلمات کلیدی:

Kirchhoff Plate, Navier Solution Method, Modified couple stress theory, Rectangular Nano-Plate, vibrations

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