

Accepted Manuscript

Vibration analysis of rotating nanobeam systems using Eringen's two-phase local/nonlocal model

Hossein Bakhshi Khaniki

PII: S1386-9477(18)30002-X

DOI: [10.1016/j.physe.2018.02.008](https://doi.org/10.1016/j.physe.2018.02.008)

Reference: PHYSE 13047

To appear in: *Physica E: Low-dimensional Systems and Nanostructures*

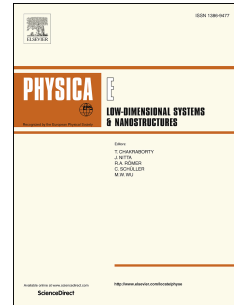
Received Date: 1 January 2018

Revised Date: 6 February 2018

Accepted Date: 8 February 2018

Please cite this article as: H.B. Khaniki, Vibration analysis of rotating nanobeam systems using Eringen's two-phase local/nonlocal model, *Physica E: Low-dimensional Systems and Nanostructures* (2018), doi: 10.1016/j.physe.2018.02.008.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Vibration Analysis of Rotating Nanobeam Systems using Eringen's Two-Phase Local/Nonlocal Model

Hossein Bakhshi Khaniki ^{a,1}

^a School of Mechanical Engineering, Iran University of Science and Technology, Narmak, Tehran
16846-13114, Iran

Abstract

Due to the inability of differential form of nonlocal elastic theory in modelling cantilever beams and inaccurate results for some type of boundaries, in this study, a reliable investigation on transverse vibrational behavior of rotating cantilever size-dependent beams is presented. Governing higher order equations are written in the framework of Eringen's two-phase local/nonlocal model and solved using a modified generalized differential quadrature method. In order to indicate the influence of different material and scale parameters, a comprehensive parametric study is presented. It is shown that increasing the nonlocality term leads to lower natural frequency terms for cantilever nanobeams especially for the fundamental frequency parameter which differential nonlocal model is unable to track appropriately. Moreover, it is shown that rotating speed and hub radius have a remarkable effect in varying the mechanical behavior of rotating cantilever nanobeams. This study is a step forward in analyzing nanorotors, nanoturbines, nanoblades, etc.

Keywords: Rotating beam; nanobeam; Eringen's integral elasticity; vibration; GDQM; mixed local/nonlocal Eringen elasticity; nanoblade; nanoturbine.

¹Corresponding author. Tel: +98 21 77240540.
E-mail address: h_bakhshi@mecheng.iust.ac.ir

Download English Version:

<https://daneshyari.com/en/article/7933579>

Download Persian Version:

<https://daneshyari.com/article/7933579>

[Daneshyari.com](https://daneshyari.com)