

Accepted Manuscript

Free vibrations of Bernoulli-Euler nano-beams by the stress-driven nonlocal integral model

Andrea Apuzzo, Raffaele Barretta, Raimondo Luciano, Francesco Marotti de Sciarra, Rosa Penna



PII: S1359-8368(17)30587-5

DOI: [10.1016/j.compositesb.2017.03.057](https://doi.org/10.1016/j.compositesb.2017.03.057)

Reference: JCOMB 4991

To appear in: *Composites Part B*

Received Date: 17 February 2017

Revised Date: 22 March 2017

Accepted Date: 26 March 2017

Please cite this article as: Apuzzo A, Barretta R, Luciano R, Marotti de Sciarra F, Penna R, Free vibrations of Bernoulli-Euler nano-beams by the stress-driven nonlocal integral model, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.03.057.

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.

Free vibrations of Bernoulli-Euler nano-beams by the stress-driven nonlocal integral model

Andrea Apuzzo^a - Raffaele Barretta^b - Raimondo Luciano^a -

Francesco Marotti de Sciarra^b - Rosa Penna^c

^a *Department of Civil and Mechanical Engineering, University of Cassino and Southern Lazio, via G. Di Biasio 43, Italy - a.apuzzo@unicas.it - luciano@unicas.it*

^b *Department of Structures for Engineering and Architecture, University of Naples Federico II, via Claudio 21, Italy - rabarret@unina.it - marotti@unina.it*

^c *Department of Civil Engineering, University of Salerno, Italy - rpenna@unisa.it*

Abstract

Nonlocal theories of Continuum Mechanics are widely used in order to assess size effects in nano-structures. In this paper, free vibrations of nano-beams are investigated by making recourse to the novel stress-driven nonlocal integral model (SDM). Equations of motion governing the dynamics of a BERNOLLI-EULER nano-beam are consistently formulated and numerically integrated by MATLAB. Selected case studies involving structures of nanotechnological interest are examined. Natural frequencies, evaluated according to the SDM, are compared with those obtained by the ERINGEN differential law (EDM) and by the gradient elasticity theory (GradEla). SDM provides an effective methodology to describe nonlocal phenomena in NEMS.

Key words: A. Nano-structures, B. Elasticity, Free Vibrations, NEMS.

Download English Version:

<https://daneshyari.com/en/article/5021258>

Download Persian Version:

<https://daneshyari.com/article/5021258>

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