

عنوان مقاله:

STATIC AND DYNAMIC RESPONSE OF CARBON NANOTUBE-BASED NANOTWEEZERS

محل انتشار:

ماهنامه بین المللی مهندسی، دوره 24، شماره 5 (سال: 1390)

تعداد صفحات اصل مقاله: 10

نویسندگان:

vahid Gharebagh - Mechanical Engineering, Urmia University

Ghader rezazadeh - mechanical engineering, Urmia university

naser sharafkhani - Mechanical Engineering , Tabriz university

rasoul shabani - mechanical engineering, Urmia university

خلاصه مقاله:

In this paper static and dynamic response of nanotweezers composed of two carbon nanotube (CNT) arms are investigated. Taking into account a continuum model and considering the electrostatic actuation as well as the presence of the van der Waals forces, the static nonlinear equations are solved by a step by step linearization and Galerkin projection method. Simulating the closing dynamics of a specific nanotweezer, the effective diameters of its nanotube cantilevers are specified and compared with existing experimental data. Then by imposing a step DC voltage and taking into account the inertia effects, dynamic responses and pull-in conditions of nanotweezers are studied. In the analyses, the effects of various parameters such as initial gap, nanotube length and diameter on the pull-in conditions are investigated. Effects of damping and asymmetric stiffness's of the arms on the pull-in voltages of a nanotweezer are also reported. Comparing the results with the published experimental data shows that the use of continuum model and employing the Galerkin based step by step linearization method (SSLM) could effectively simulate the response of nanotweezers

کلمات کلیدی:

Key words Nanotweezer, Dynamic analysis, Pull, in voltage, Nanotube

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1390940>

