

عنوان مقاله:

Application of Contact Mechanics Models in Manipulation of Biological Cells

محل انتشار:

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نویسندگان:

Z Rastegar - MSc Student of Iran University of Science and Technology, Tehran, Iran

M.H Korayem - Professor of Iran University of Science and Technology, Tehran, Iran

M Geramizadeh

خلاصه مقاله:

Contact mechanics is the study of the deformation of solids that touch each other at one or more points. The physical and mathematical formulation of the subject is built upon the mechanics of materials and continuum mechanics and focuses on computations involving elastic, viscoelastic, and plastic bodies in static or dynamic contact. Contact mechanics provides necessary information for the safe and energy efficient design of technical systems. During nano-manipulation process, contact forces cause indentation in contact area between nano-particle and tip/substrate which is considerable at nano-scale and affects the nano-manipulation process. Several nano-contact mechanics models such as Hertz, DMT, JKRS, BCP, MD, COS, PT, and Sun have been applied as the continuum mechanics approaches at nano-scale. Manipulation of nano-scale biological particles such as cells and proteins are so important but have not been studied properly till now. These particles have different mechanical properties so their manipulation and equations are more complicated and contact mechanics models should be modified for biological particle and its environment. In this article different nano-contact mechanics models have been simulated and compared for biological condition. These simulations and comparisons resulted in choosing Tatara as the most proper model. Since biological cells have large deformation and this model can conveniently be used

کلمات کلیدی:

Nano-contact mechanics, Cell manipulation, Tatara model

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