Nanocomposites and nanomaterials

Stress state of elastic half-space with compliant inclusion under Rayleigh wave incidence

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Investigation of wave field in the bodies with inhomogeneities of nanostructures has practical interest for the problems of non-destructive methods of control and diagnostics, strength assessment structures, ets. The issue of elastic waves diffraction in thin defects under shock and time-harmonic loads devoted works [1-3]. A special interest represents thin defects of such compliant inclusions. The relevant tasks are important for renewable nanotechnologies. By way of selection material filling the strength of bodies with crack defects can be greatly increased.

In the proposed work the boundary integral equations method is used to study the interaction of Rayleigh surface waves with compliant inclusion in an elastic half-space. The problem is reduced to solving two-dimensional boundary integral equation of Helmholtz potential type regarding for the normal opening-displacement in the location of inclusion.

Dynamic stress intensity factors near points of the contour inclusion are analyzed. The effect on their value the frequency of oscillations, relations of rigidity material defect and matrix and the depth of inclusion are investigated.

1. *Kanaun S.* Scattering of monochromatic elastic waves on a planar crack of arbitrary shape // Wave Motion.-2014.-**51**.-P. 360-381.
2. *Mykhas'kiv V. V., Butrak I. O., Laushnik I. P.* Interaction between a compliant disc-shaped inclusion and a crack upon incidence of an elastic wave // J Appl Mech Tech Phys.-2013.-**54**.-P. 465-471.
3. *Skalsky V., Stankevych O., Serhiyenko O.* Wave displacement field at a half-space surface caused by an internal crack under twisting load // Wave Motion.-2013.-**50**.-P. 326-333.