

On the Contact Thermoelastic Problem with Frictional Heating, Wear and Auto-Vibrations

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Friction, wear, heat generation, relative velocity and temperature deformation are complex processes which influence each other making up a sole diverse process of a friction unit work. In this work the results devoted to a novel problem of the mechanical system exhibiting frictional thermoelastic contact of a moving body subject to both non-constant friction coefficients and wear are presented and discussed. It is worth noticing that in the case of non-constant friction coefficient and heating, the self-excited vibration can appear in our system without an elastic part (stiffness). Consider contact and wear of one-dimensional model of the thermo-elastic contact of a body with a surrounding medium. Assume, that this body is represented by a rectangular plate. The vector components related to displacements as the plate temperature depend only on the co-ordinate vertical to the contact surface and time. The plate has the mass subject to the force and moves vertically along walls in direction along the contact surface. It causes a parallelepiped heat extension, and the body starts to contact with walls. In the result of this process a frictional contact and wear on the parallelepiped sides occurs. We assume Archard's law of wear. Stability of the stationary solutions is estimated, and contact parameters are computed numerically.

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