

THE GENERALIZED MODEL OF VISCOUS FRICTION

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The problem of the dynamics of a convex solid body on the horizontal supporting plane is considered. It is assumed that the contact area of the body and the plane is a flat ellipse which parameters are determined by the Hertz contact theory. It is believed that the local friction forces are described by the law of viscous friction. The resultant force and the moment of friction are defined by integration over the contact patch. The obtained model takes into account the relationship between the friction sliding friction and spinning friction, but does not account for the rolling friction. Moreover, in resulting model the force and the moment of friction depends on the orientation of the body.

The constructed model of friction is used for numerical research of the dynamics of a convex ellipsoid. In the Hertz contact theory eccentricity of the contact patch is determined by transcendental equations. It is shown that it can be replaced by the eccentricity of the ellipsoid section by horizontal plane situated at a low height from the supporting plane. This change greatly simplifies the calculations.

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