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Multidimensional Model of Combined Dry Friction

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A new multidimensional model of combined dry friction is presented. This model is generalization of primary one-dimensional Coulomb model to the case when relative motion of rubbing solids is combination of sliding and spinning for arbitrary form of area of contact. It is proved that expressions for the both components of friction force and for momentum as function of velocity of sliding and rotations are invariant with respect to similarity group. The method of straight constricting of quadratic Pade approximation of components of friction force and momentum is developed for using of the proposed model in the task of solids dynamics. The case of axially symmetric areas of contact such as ellipse, rectangular is investigated in details.

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