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A NEW EFFECTIVE APPROACH TO DRY FRICTION MODELING UNDER CONDITIONS OF COMBINED KINEMATICS

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It is presented a new approach to dry friction modeling under conditions of combined kinematics which is consist in the building of the dry friction models which are suitable for using in differential equations of motion. Under the proposed models of friction are understudied the interrelations between friction force components, torques and velocities which are represented in the analytical functions. The procedure of the models constructing consists of the two parts. In the first part, the exact integral expressions for the net vector and torque are formed with the assumption that Coulomb's friction law in classical or generalized forms is valid at each point of the contact area. In the second part the exact integral models are replaced by a new type of approximated models which are the ratio of the linear form to square root of the quadratic form. This replacement is based on the general analytical properties of the normal contact stresses distribution inside of contact spot. Thus, we have the universal procedure for models construction in difference conditions of motions. In the distinguish of the previously constructed dry friction models based on Pade approximants, these models permit to escape using not smooth functions in the cases when velocities are changed their signs. Moreover, they are defined by the same coefficients amounts as models based on Pade expansions and completely satisfy to the all integral model analytical properties as function kinematics parameters.