

Dynamics simulations of a rigid body lying on a vibrating table with the use of special approximations of the resulting contact forces

Michał Szewc, Grzegorz Kudra, Igor Wojtunik, Jan Awrejcewicz

Abstract: The work presents simulations and dynamics of a rigid body lying on a vibrating table. An attempt of shaping and control the body dynamical behavior, by the use of manipulation of parameters of the table oscillations, is presented. This work is also an implementation of the specially prepared mathematical models of friction between table and the moving body. Those models are based on the integral model assuming the fully developed sliding on the plane contact area with the foundation of any pressure distribution. In order to simplify the calculations and reduce their computational cost, special approximations of the integral models of friction force and moment are used. They are based on Padé approximants and their generalizations.

¹⁾ Michał Szewc, M.Sc. (Ph.D. student): Lodz University of Technology, 90-924 Lodz, POLAND (michal.szewc@dokt.p.lodz.pl), the author presented this work at the conference.

²⁾ Grzegorz Kudra, Ph.D. D.Sc. (Assistant Professor): Lodz University of Technology, 90-924 Lodz, POLAND (grzegorz.kudra@p.lodz.pl).

³⁾ Igor Wojtunik, M.Sc. (Ph.D. student): Lodz University of Technology, 90-924 Lodz, POLAND (igor.wojtunik@dokt.p.lodz.pl).

⁴⁾ Jan Awrejcewicz, Professor: Lodz University of Technology, 90-924 Lodz, POLAND (jan.awrejcewicz@p.lodz.pl).