

# SYSTEMS OF RIGID BODIES WITH DIFFERENTIAL CONSTRAINTS AND FRICTION

TRACK NUMBER 1500 - FLUID-STRUCTURE INTERACTION, CONTACT AND  
INTERFACES

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## ABSTRACT

The minisymposium will be mostly about dynamics of the multibody systems with contacts, especially, the systems with differential constraints (usually, they are conditions of non-slipping) or with dissipative holonomic constraints. In the second case, various models of tangent reaction can be considered. The following questions will be of particular interest:

- 1) Defining and calculating the forces and torques during the contact (one-point or extended contact) and calculating the contact zone.
- 2) A qualitative investigation of the dynamics in the classical problems on the motion of bodies along a rough surface, such as the Celtic stone, the tippe-top, Chaplygin and Carateodori sleighs, etc. These problems, especially with the different models of friction, can be used as benchmark problems for numerical systems of mechanical systems' modeling.
- 3) The influence of the friction models on the dynamics of wheeled systems – for different types of wheels, including omni- and mecanum-wheels.
- 4) Numerical methods in the problems under consideration, including regularization of dry friction, tracking of contact, etc.
- 5) Software for simulation of rigid bodies' systems: languages adapted for contact modeling, inheritance hierarchy of contact models and their properties.

As Keynote Lectures we propose:

- 1) Qualitative properties of the dynamics of systems with extended, but small (comparing to the length scale of the problem) contact zone, where tangent stresses vanish or are defined by Amonton-Coulomb law [1, 2].
- 2) Object-oriented algorithms of numerical models' construction for mechanical systems with point contacts or patches of contact [3].

We welcome the talks on the qualitative or numerical analysis of the dynamical properties of mechanical systems with friction or differential constraints. We hope that the members of Organizers' research group will join the Minisymposium (M.A. Munitsyna, A.Yu. Shamin, A.S. Kuleshov, G.N. Moiseev, K.A. Katasonova, M.P. Chaplygina).

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