

Thematic session title

NUMERICAL METHODS IN CONTACT MECHANICS

Organizers

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Abstract

The proposed session is devoted to *unilateral contact with friction from the computational point of view*. Contacts resisting only to normal compressive stresses and to frictional stresses are commonly encountered in our daily lives and in many industrial processes and applications: from tire behaviour to crashworthiness investigations, from the sudden slide in a geological fault generating an earthquake to the behaviour of masonry structures, from railway ballasts to the manipulation of granular materials in food or pharmaceutical industries, from rock falls in mountainous areas to the process of avalanche formation in large collections of granular bodies, from the occurrence of frictional induced instabilities to the existence of wedging states, from brake squealing to deep drawing of metallic sheets, the list is almost endless.

It is widely known that the strongly nonlinear behaviour of structures, mechanisms or systems having frictional contacts of the unilateral contact has posed (and continues to pose) challenges to mathematicians, mechanicians, computer mechanicians and experimentalists. The non-smooth character of frictional contact raises, in particular, difficulties at the formulation and numerical resolution levels, two aspects connected with computational simulation.

This thematic session intends to gather active researchers from the widest possible range of topics in contact mechanics *with a strong emphasis on the development or use of computational methods*. A non exhaustive set of topics adequate to be presented is: algorithms and numerical methods, nonsmooth dynamics and impacts, multibody dynamics, frictional contact laws (anisotropy, adhesion, rate and state dependent friction, thermal effects, wear), controlled systems with friction, damping effects of friction, mortar methods, nanotribology, optimization of structures submitted to frictional constraints, rolling contact, static, quasistatic or dynamic problems, parallel computing, instabilities and wave propagation.

The scope of the session is broad. Presentations on realistic models for complex systems comprising large numbers of degrees of freedom and presentations more focused on models and strategies to simplify the analyses of large systems are equally welcome.

It is our aim to give an account of the modern developments in contact problems and on the numerical methods to solve them. If you have recent work on computational contact mechanics this is the thematic session you should attend and to which you should submit an abstract!