Poziv na predavanje:

Mechanics of multi-body systems and its numerical implementation: the discrete-element method

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(Sveučilište u Rijeci – Građevinski fakultet)

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HRVATSKO DRUŠTVO ZA MEHANIKU
ZAGREB – OSIJEK – RIJEKA – SL. BROD – SPLIT

Predavanje HDM-a:

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SUMMARY

There are many challenges for engineers when it comes to handling powder storage, grain conveying in industrial processing or dry-wall structures in civil engineering because they are neither a continuous solid nor fluid - they are granular materials. In these materials, the grains or blocks are distinct objects so each of them has to be treated as a single rigid or deformable body with its own degrees of freedom.

We could consider media composed of particles as a continuous medium and use the methods of continuum mechanics along with appropriate numerical methods, such as the finite-element method. But we can also apply the principles of multibody-system mechanics considering each particle interacting with the others through contact laws. This approach is more appropriate for granular matter since we can investigate mechanisms at the particle scale: we can expect to relate macroscopic behaviour (expressed through e.g. stress and strain fields) to microscopic properties (e.g. particle geometry, polydispersity).

In this lecture, the key equations of solid mechanics and contact laws will be presented and their numerical implementation in the discrete-element methods will be shown. We will conclude with several results in mechanical and civil engineering.

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ŽIVOTOPIS predavača: Dr Jean-François Camenen

Dr Jean-François Camenen is a post-doctoral researcher at the Faculty of Civil Engineering, University of Rijeka, working on the Croatian Science Foundation project *CANFAS*. He studied mechanics and physics in France (BSc, University of Provence; MSc, University of Rennes and PhD, University of Nantes) and is an associate member of the research group "Earthquake and Geotechnical Engineering" of the University of Bristol in United Kingdom.

His research deals with dense granular materials such as railway ballast, concrete, soil, sand embankment and multiblock structure such as masonry. His studies focus on their performance, their manufacturing (mixing, compaction) and their damage due to erosion, indentation, shocks or seismic events.

His expertise is solid mechanics of multibody systems and statistical physics as well as the use and development of advanced numerical tools such as the discrete-element methods.