DEEP TECH 2M

BOOK OF ABSTRACTS

DEEP TECH OPEN SCIENCE DAY 2024

1ST DEEP TECH OPEN SCIENCE DAY CONFERENCE
APRIL 5, 2024, KRAGUJEVAC, SERBIA

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ПРИРОДНО-МАТЕМАТИЧКИ ФАКУЛТЕТ 1972 КРАГУЈЕВАЦ

Numerical Modeling of Coupled Fluid - Solid Dynamics

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Abstract

The problem of deformable bodies motion, floating or flying in fluid flow is common in engineering practice. A variety of examples comprise: flying of aircrafts in the air, diving of submarines, bullet flight through the air or water, flying of a ball through the air in various sports (soccer, tennis, golf, etc.), transport of solids by fluids in industrial pulp processing plants, transport of mineral raw materials in mines, etc. There are also examples in biological systems: motion of aerosol particles in the respiratory tract, motion of blood cells in the cardio-vascular system, etc. The aim of this work is to explain practical implementation of the algorithm that enables the coupling of solid and fluid equations to model the fluid – solid interaction.

The potential for the application of such a software solution lies in the application of modeling of physical processes where the interaction of solid and fluid occurs. The goal of modeling is usually the simplification of the product development or deep insight into the processes that occur in complex systems with interaction of solids bodies with fluid. Examples of application in modeling of biological systems are: modeling of the stent implantation procedure in coronary arteries, modeling of experiments with blood cells where the separation of cancerous and healthy blood cells is performed, modeling of the motion of blood cells through the capillary narrowing, etc.

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