

Predavanja u HDMu:

M5 numerical modelling of advanced materials, processes and systems

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SAŽETAK

It will be shown how M5 numerical modelling can be applied to solve non-linear and coupled problems in materials sciences, high-tech engineering, biophysics and converging sciences (nano, info, bio, cogni) by taking into account Multi-physics, Multi-scale, Multi-phase, Multi-body and Multi-objective aspects of interacting phenomena. To develop so complex FEM models the AceGen and AceFEM systems are applied which enable formulation of M5 problems on a very high abstract level by using symbolic formulations combined with automated procedures to generate FEM codes for primal and sensitivity analyses of M5 problems. In C3M several scientific and high-tech industrial solutions have been developed in recent years by applying the M5 approach. The examples presented will include materials forming in coupled mechanical, thermal and electromagnetic fields, production of nano-powders, electroporation of biological tissues as well as multi-scale modelling of human skin and touch. The lecture will conclude with a discussion on future challenges in computational mechanics and opportunities to develop new solutions for M5 problems in 3D printing of advanced materials for space applications.