Analysis, modeling and computational mathematics

Mathematical and functional analysis, mathematical modeling and computational mathematics belong among the fields represented in the world by seminal contributions of outstanding Czech mathematicians such as Bolzano, Kurzweil, Nečas, Pták, Fiedler and Babuška. These related classical disciplines are at present complemented by the development of scientific computing and non-equilibrium thermodynamics. Recent research topics include analysis of function spaces used in the theory of partial differential equations, regularity of admissible and minimizing deformations in nonlinear elasticity, thermodynamical and mathematical (partial differential equations) analysis of mechanical, thermal, electromagnetic and chemical processes in complex fluids and solids and their interactions, large scale iterative computations, sparse direct algebraic solvers, numerical stability, a posteriori error analysis and adaptivity in numerical solution of partial differential equations. Research activities of the junior researchers are also linked with research of their peers in planetary physics and astrophysics within the University Centre (UNCE) for mathematical modeling, applied analysis and computational mathematics, financed for the period 2018-2023.

Selected outputs

- Pavelka, Michal; Klíka, Václav; Gmela, Miroslav: Multiscale Thermo-Dynamics, Introduction to GENERIC. Berlin: De Gruyter, 2018.