

The standard approach to modelling mechanics of continuum based on balances of mass, momentum, angular momentum and energy is a very powerful tool. However, there is no connection between that and the Hamiltonian mechanics, that superbly describes kinematics of isolated particles. Thus, the two topics are rather isolated. Nevertheless, there is another approach to continuum mechanics – a one, whose reversible part is based on Hamiltonian mechanics, while the irreversible is generated by a dissipation potential.

This framework, called GENERIC, is thus an interesting bridge between continuous and discrete systems. In this thesis, we present the GENERIC framework applied to a continuous body, derive the governing equations and compare them to the standard theory. Both analytical and numerical solutions to a decent range of model examples are presented and analysed.