Presented master's thesis deals with modeling of a NiTiNOL wire under thermal and uniaxial mechanical loading. NiTiNOL can undergo reversible martensitic phase transformation and thus belongs among shape memory alloys. In the form of a thin wire it is used in many applications (e.g. as a reinforcement for veins).
MT is studied with respect to the extended non-equilibrium thermomechanics of mixtures and the Clusius-Clapeyron equation is derived for it. A new phenomenological model iRLOOP, developed at AS CR, simulating thermomechanical behavior of a NiTiNOL wire is mathematically formulated. Restrictions on tting functions in proposed hysteresis mechanism are derived from the second law of thermodynamics. The existence and uniqueness of the solution of an initial problem are proven for the superelasticity model. Experiments are compared with results modeled by numerical implementation of iRLOOP.