Abstract: The goal of the thesis was a qualitative analysis of system of partial differential equations describing simplified steady incompressible fluid flow with implicitly given Cauchy stress tensor. In chapter 2 one can find issues regarding generalization of constitutive relations for the Cauchy stress tensor. It was necesarry to get familiar with mathematical tools used for proving the existence of weak solutions of such studied equations.
In chapter 3 we study stress tensor given as a continuous function of velocity gradient satisfying some restrictive conditions and prove the existence of weak solution. In chapter 4 detailed proof is presented for implicitly given stress tensor leading to the so called maximal monotone r-graph. Both cases are ilustrated on concrete models.