

The thesis is dedicated to the study and numerical analysis of the non-linear flows in the porous media, using general Forchheimer models. In the numerical analysis, the local discontinuous Galerkin method is chosen. The first part of the paper is dedicated to the derivation of the studied equations based on the physical motivation and summarizing the theory needed for the further analysis. Core of the thesis consists of the introduction of the chosen discretization method and the derivation of the main stability and a priori error estimates, optimal for the linear ansatz functions. At the end we present a couple of numerical experiments to verify the results.