

This work focuses on the study of two-phase flow. Mathematical model and numerical approximation of the flow of two immiscible incompressible fluids is studied. The interface between the fluids is described with the aid of the level set method. The discretization in space and in time is introduced. The finite element method with backward Euler time discretization is applied to the Navier-Stokes equations and space-time discontinuous Galerkin method is used for solving the non-linear transport problem. The emphasis is put on the error analysis of discontinuous Galerkin method of lines and space-time discontinuous Galerkin method for the transport problem. The numerical results are shown.