

The topic of this thesis is the application of the discontinuous Galerkin finite element method (DGFEM) on space-time discretizations of simple nonstationary problems. Unlike the standard finite element method, discontinuous Galerkin method does not require any continuity between neighbouring elements. We apply the DGFEM separately in space and in time. At first, we implement discretization with respect to space variables, whereby we acquire the space semidiscretization. Subsequently we apply Time discontinuous Galerkin method to the problem. We seek the approximate solution in the space of discontinuous piecewise polynomial functions of degree  $p$  in space and degree  $q$  in time. This is followed by the error estimates of this scheme. In the end we examine the superconvergence behaviour of the scheme in nodes of the time discretization. The theoretical results are verified by numerical experiments.