

Abstract: Our work describes the simulation of traffic flows on networks. These are described by partial differential equations. For the numerical solution of our models, we use the discontinuous Galerkin method in space and a multistep method in time. This combination of the two methods on networks is unique and leads to a robust numerical scheme. We use several different approaches to model the traffic flow. Thus, our program must solve both scalar problems as well as systems of equations described by first and second order partial differential equations. The output of our programs is, among other things, the evolution of traffic density in time and 1D space. Since this is a physical quantity, we introduce limiters which keep the density in an admissible interval. Moreover, limiters prevent spurious oscillations in the numerical solution. All the above is performed on networks. Thus, we must deal with the situation at the junctions, which is not standard. The main task is to ensure that the law of conservation of the total amount of cars passing through the junction is still satisfied. This is achieved by modifying the numerical flux for junctions. The result of this work is the comparison of all the models, the demonstration of the benefits of the discontinuous Galerkin method and the influence of limiters.