

In this bachelor thesis we investigate geodesics in helically symmetric spacetimes in the framework of linearized Einstein's gravity. Work is an extension of paper by Bičák, Scholtz and Bohata [2], which is under preparation. First we introduce standard numerical methods for solving systems of ordinary differential equations. Next we present helically symmetric solution of linearized Einstein's equations and numerical code solving the geodesic equation on given background. We discuss conditions of existence of helically symmetric solution and finally we present selected results obtained by numerical simulations. We give present few particular examples of geodesics, selected phase portraits obtained by the method of the Lyapunov exponents and visualize the causal structure of helically symmetric spacetime.