

In the review part of this bachelor thesis, we summarize various results about solutions to Einstein's gravitational field equations which describe both non-expanding and expanding impulsive gravitation waves in spacetimes of constant curvature. Special attention will be paid to geodesic motion in these spacetimes and to geometrical methods of their construction. In the original part of the thesis, we check compatibility of a direct solution to geodesic equation in (anti-)de Sitter spacetime with non-expanding impulsive wave and refraction formulae derived under the assumption of continuity of geodesics in a specific coordinate system. We also investigate an interaction of test particles with expanding spherical impulsive wave propagating on the Minkowski background which is generated by a pair of perpendicular snapping cosmic strings.