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Invariant Characterization and its Applications

Tuesday 18 June 2024 11:00 (30 minutes)

We begin by discussing the Cartan-Karlhede algorithm, and its use in characterizing spacetimes, through the aid of the Newman Penrose formalism. We then introduce some ideas based on the invariant properties of a spacetime, like the geometric horizon conjecture, and how such surfaces are defined in terms of Cartan scalars, and how these are sometimes connected with the conventional notion of a marginally outer trapping surface. We then discuss an application of the invariant characterization of the collapse of a spherically symmetric perfect fluid, which was solved numerically, and discuss the formation of a geometric horizon in this system, and how the numerics can be aided by the invariant characterization. We then conclude with a brief description of another of the Cartan scalars, based on a recent paper, discussing photon surfaces in arbitrary spacetimes.

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