A SURVEY ON SPACETIME GEOMETRIES AND RELATIVISTIC MODELS

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Purpose: *The notion of spacetime is composed of 'space' and 'time' to a single universe. A spacetime of (n + 1)-dimension requires "n" space dimensions and "1" time dimension. In this work, after introducing some fundamental facts on spacetime, we provide well known examples of these spacetime geometries. The purpose of our study is to analyze and compare these background geometries with related relativistic models derived by using the metric elements.*

Methods: *Relativistic models are derived by using Christoffel symbol and energy momentum equations. Moreover, the numerical experiments on the relativistic model are examined by using finite difference and finite volume approximations.*

Results and Conclusion *Our analysis starts with the flat geometry, so-called Minkowski spacetime, and follows by further generalizations on specific spherically symmetric geometries whose metric elements describe solutions to the Einstein's field equation. Next the relativistic models originated from the conservation form of the energy momentum tensor relation on these particular examples of spacetime geometries are presented. Finally we introduce certain properties of these models of interests and hence provide a conclusion including a comparison (both theoretically and numerically) of the models of related geometries.*

Keywords*: Spacetime, Relativistic Models, Energy Momentum Tensor, Euler Equations, Burgers Equations, Finite Difference Method, Finite Volume Method*

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