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Reissner-Nordström Spacetime Geometry: Derivation of the Euler and Burgers Models

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Abstract

A relativistic generalization of the Euler and Burgers models have recently been introduced and analyzed both theoretically and numerically. In this work we extend these analysis to a particular type of the Lorentzian manifold, so called the Reissner-Nordström (R-S) spacetime geometry. We introduce basic properties of the R-S spacetime and its metric components containing electrical charge term which distinguish the R-S spacetime from the Schwarzschild geometry. Furthermore, we present a derivation of the Euler and Burgers models for a 1+1 dimensional R-S geometry with some numerical results.

Keywords: Reissner-Nordström Spacetime; Lorenzian geometry; Relativistic Equations; Finite Difference Method.

References

- [1] T. Ceylan, and B. Okutmuşur, Finite volume approximation of the relativistic Burgers equation on a Schwarzschild-(Anti-)de Sitter spacetime. *Turk J Math*, **41**: 1027-1041, 2017.
- [2] T. Ceylan, and B. Okutmuşur, Finite Volume Method for the Relativistic Burgers Model on a (1+1)- Dimensional de Sitter Spacetime. *Math. Comput. Appl.*, **21(2)**: 16, 2016.
- [3] T. Ceylan, P. LeFloch and B. Okutmuşur, A Finite Volume Method for the Relativistic Burgers Equation on a FLRW Background Spacetime. *Commun. Comput. Phys.*, **23**: 500-519, 2018.
- [4] P. LeFloch, H. Mahklof and B. Okutmuşur, Relativistic Burgers equations on a curved spacetime. Derivation and finite volume approximation. *SIAM Journal on Numerical Analysis*, **50(4)**: 2136-2158, 2012.
- [5] G.G.L Nashed, Stability of Reissner-Nordström Black Hole. *Acta Physica Polonica*, **112**:13-19, 2007.