

Classes of Exact Isotropic Solutions, a Solution Generating Algorithm

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Exact solutions of the Einstein-Maxwell field equations are of crucial importance in relativistic astrophysics. These solutions may be utilized to model a charged relativistic star as they are matchable to the Reissner-Nordstrom exterior at the boundary.

In order to solve the field equations, various restrictions have been placed on the geometry of spacetime and the matter content. Mainly two distinct procedures have been adopted to solve these equations. Firstly, the coupled differential equations are solved by computation after choosing an equation of state. Secondly, the exact Einstein-Maxwell solutions can be obtained by specifying the geometry and the form of the electric field.

In this paper, I used the latter technique to establish a new algorithm that generates a new solution to the Einstein-Maxwell field equations from a seed solution. The new solution is expressed in terms of integral of known functions, and the integration can be completed in principle. The applicability of this technique has already been demonstrated by generating new solution for a seed solution.

Key words: Einstein-Maxwell solutions, Charged relativistic star.