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EXACT RELATIVISTIC CHARGED STELLAR MODELS

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We consider the Einstein-Maxwell system of equations in the context of isotropic coordinates for matter distributions with isotropy pressure in the presence of an electric field. The main objective of this paper is to generate a class of exact solutions to the Einstein-Maxwell system of equations that is physically acceptable. We generalize the solution to the Einstein-Maxwell system, with no singularity in the matter distribution and the gravitational potentials at the centre of the fluid sphere. In the methodology we give the expression of the line element modelling the interior of relativistic star which allows us to rewrite the Einstein-Maxwell equations in terms of new variables. We present the basic assumptions for the physical models. We make a choice for one of the gravitational potentials and the electric field intensity which allow us to integrate the field equations. We present exact solutions for the Einstein-Maxwell system in static spherically symmetric interior space times for a charged perfect fluid sphere in a series form. For specific parameter values it is possible to find an exact model for the Einstein –Maxwell system in terms of elementary functions. A physical analysis indicates that the matter distributions are well behaved and regular throughout the stellar structure. Our model includes a particular charged solution found previously; this suggests that our generalized solution could be used to describe relativistic compact sphere.

Keywords*: Einstein-Maxwell system, Exact solutions*