

Poisson Type Spherically Symmetric Spacetimes

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Abstract : Conformastat spherically symmetric exact solutions of Einstein's field equations representing matter distributions made of fluid both perfect and anisotropic from given solutions of Poisson's equation of Newtonian gravity are investigated. The approach is used in the construction of new relativistic models of thick spherical shells and three-component models of galaxies (bulge, disk, and dark matter halo), writing, in this case, the metric in cylindrical coordinates. In addition, the circular motion of test particles (rotation curves) along geodesics on the equatorial plane of matter configurations and the stability of the orbits against radial perturbations are studied. The models constructed satisfy all the energy conditions.

Keywords : general relativity, exact solutions, spherical symmetry, galaxy, kinematics and dynamics, dark matter

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