

Relativistic anisotropic stars with the polytropic equation of state in general relativity

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Spherically symmetric relativistic stars with the polytropic equation of state, which possess the local pressure anisotropy, are considered in the context of general relativity. The generalized Lane-Emden equations are derived for the arbitrary anisotropy parameter. They are then applied to some special ansatz for the anisotropy parameter in the form of the differential relation between the anisotropy parameter and the metric function ν . The analytical solutions of the obtained equations are found for incompressible fluid stars and then used for getting their mass-radius relation, gravitational and binding energy. Also, the equation for studying the dynamical stability of incompressible fluid stars with respect to radial oscillations is obtained and analyzed.

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