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Exact solutions in astrophysics

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There are over 1300 known exact solutions to Einstein's equations. Part of these solutions found applications in astrophysics including the solar system, compact objects, and cosmology. These have offered some physical or mathematical insights into the systems under consideration. In this review talk, some characterizing notions about exact solutions will be outlined along with some examples. After a brief presentation of some neutron star models, the discussion will focus on inhomogeneous cosmological models and their applications. The related problem of averaging in relativity and cosmology will also be outlined.

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