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8 Fluid sources9 Einsteinian spacetimes; 9.1 Definition; 9.2 Regularity hypotheses; 10 Newtonian approximation; 10.1 Equations for potentials; 10.2 Equations of motion; 11 Gravitational waves; 11.1 Minkowskian approximation; 11.2 General linear waves; 12 High-frequency gravitational waves; 12.1 Phase and polarizations; 12.2 Radiative coordinates; 12.3 Energy conservation; 13 Coupled electromagnetic and gravitational waves; 13.1 Phase and polarizations; 13.2 Propagation equations; IV: Schwarzschild spacetime and black holes; 1 Introduction; 2 Spherically symmetric spacetimes
3 Schwarzschild metric4 Other coordinates; 4.1 Isotropic coordinates; 4.2 Wave coordinates; 4.3 Painleve-Gullstrand-like coordinates; 4.4 Regge-Wheeler coordinates; 5 Schwarzschild spacetime; 6 The motion of the planets and perihelion precession; 6.1 Equations; 6.2 Results of observations; 6.3 Escape velocity; 7 Stability of circular orbits; 8 Deflection of light rays; 8.1 Theoretical prediction; 8.2 Results of observation; 8.3 Fermat's principle and light travel parameter time; 9 Red shift and time delay; 10 Spherically symmetric interior solutions; 10.1 Static solutions. Upper limit on mass
10.2 Matching with an exterior solution

Sommario/riassunto

Aimed at researchers in mathematics and physics, this monograph, in which the author overviews the basic ideas in General Relativity, introduces the necessary mathematics and discusses some of the key open questions in the field. - ;General Relativity has passed all experimental and observational tests to model the motion of isolated bodies with strong gravitational fields, though the mathematical and numerical study of these motions is still in its infancy. It is believed that General Relativity models our cosmos, with a manifold of dimensions possibly greater than four and debatable topology