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	Nota di contenuto	1. Inverse scattering technique in gravity -- 1.1. Outline of ISM -- 1.2. The integrable ansatz in general relativity -- 1.3. The integration scheme -- 1.4. Construction of the n-soliton solution -- 1.5. Multidimensional spacetime -- 2. General properties of gravitational solitons -- 2.1. The simple and double solitons -- 2.2. Diagonal background metrics -- 2.3. Topological properties -- 3. Einstein-Maxwell fields -- 3.1. The Einstein-Maxwell field equations -- 3.2. The spectral problem for Einstein-Maxwell fields -- 3.3. The components g [subscript ab] and the potentials A[subscript a] -- 3.4. The metric component f -- 3.5. Einstein-Maxwell breathers -- 4. Cosmology: diagonal metrics from Kasner -- 4.1. Anisotropic and inhomogeneous cosmologies -- 4.2. Kasner background -- 4.3. Geometrical characterization of diagonal metrics -- 4.4. Soliton solutions in canonical coordinates -- 4.5. Solutions with real poles -- 4.6. Solutions

with complex poles -- 5. Cosmology: nondiagonal metrics and perturbed FLRW -- 5.1. Nondiagonal metrics -- 5.2. Bianchi II backgrounds -- 5.3. Collision of pulse waves and soliton waves -- 5.4. Solitons on FLRW backgrounds -- 6. Cylindrical symmetry -- 6.1. Cylindrically symmetric spacetimes -- 6.2. Einstein-Rosen soliton metrics -- 6.3. Two polarization waves and Faraday rotation -- 7. Plane waves and colliding plane waves -- 7.1. Overview -- 7.2. Plane waves -- 7.3. Colliding plane waves -- 8. Axial symmetry -- 8.1. The integration scheme -- 8.2. General n-soliton solution -- 8.3. The Kerr and Schwarzschild metrics -- 8.4. Asymptotic flatness of the solution -- 8.5. Generalized soliton solutions of the Weyl class -- 8.6. Tomimatsu-Sato solution.

Sommario/riassunto	This 2001 book gives a self-contained exposition of the theory of gravitational solitons and provides a comprehensive review of exact soliton solutions to Einstein's equations. The text begins with a detailed discussion of the extension of the Inverse Scattering Method to the theory of gravitation, starting with pure gravity and then extending it to the coupling of gravity with the electromagnetic field. There follows a systematic review of the gravitational soliton solutions based on their symmetries. These solutions include some of the most interesting in gravitational physics such as those describing inhomogeneous cosmological models, cylindrical waves, the collision of exact gravity waves, and the Schwarzschild and Kerr black holes. A valuable reference for researchers and graduate students in the fields of general relativity, string theory and cosmology, this book will also be of interest to mathematical physicists in general.