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   Nota di contenuto   Equations of Fluid dynamics and the shallow water approximation -- Integrability and related analytical properties of nonlinear PDE systems

-- Analytical properties of some classical shallow-water models -- Discussion.

Sommario/riassunto	Nonlinear partial differential equations (PDE) are at the core of mathematical modeling. In the past decades and recent years, multiple analytical methods to study various aspects of the mathematical structure of nonlinear PDEs have been developed. Those aspects include C- and S-integrability, Lagrangian and Hamiltonian formulations, equivalence transformations, local and nonlocal symmetries, conservation laws, and more. Modern computational approaches and symbolic software can be employed to systematically derive and use such properties, and where possible, construct exact and approximate solutions of nonlinear equations. This book contains a consistent overview of multiple properties of nonlinear PDEs, their relations, computation algorithms, and a uniformly presented set of examples of application of these methods to specific PDEs. Examples include both well known nonlinear PDEs and less famous systems that arise in the context of shallow water waves and far beyond. The book will be of interest to researchers and graduate students in applied mathematics, physics, and engineering, and can be used as a basis for research, study, reference, and applications.