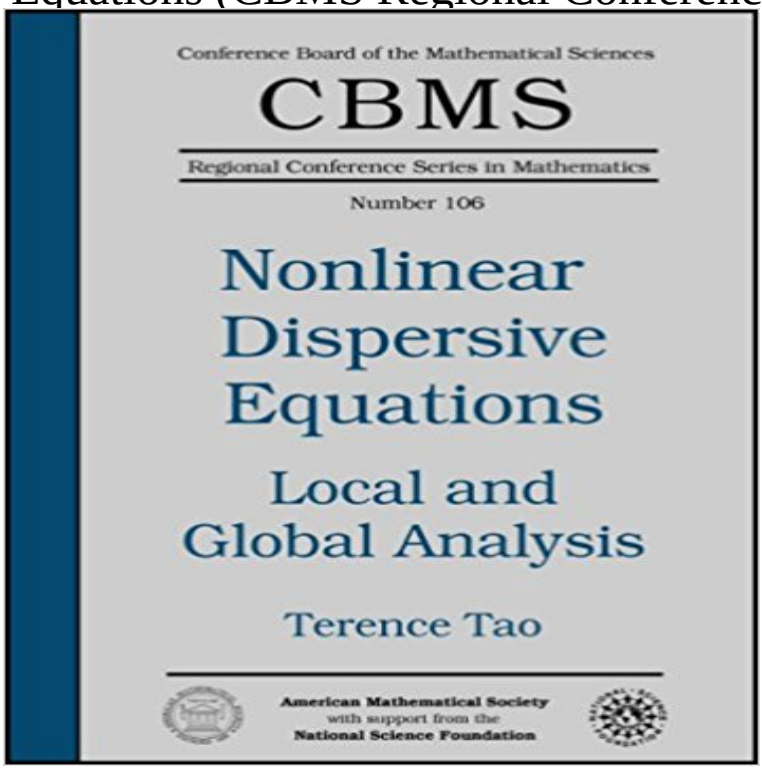
Local And Global Analysis of Nonlinear Dispersive And Wave Equations (CBMS Regional Conference Series in Mathematics)



Among nonlinear PDEs, dispersive and wave equations form an important class of equations. These include the nonlinear SchrAdinger equation, the nonlinear wave equation, the Korteweg de Vries equation, and the wave maps equation. This book is an introduction to the methods and results used in the modern analysis (both locally and globally in time) of the Cauchy problem for such equations. Starting only with a basic knowledge of graduate real analysis and Fourier analysis, the text first presents basic nonlinear tools such as the bootstrap method and perturbation theory in the simpler context of nonlinear ODE, then introduces the harmonic analysis and geometric tools used to control linear dispersive PDE. These methods are then combined to study four model nonlinear dispersive equations. Through extensive exercises, diagrams, and informal discussion, the book gives a rigorous theoretical treatment of the material, the real-world intuition and heuristics that underlie the subject, as well as mentioning connections with other areas of PDE, harmonic analysis, and dynamical systems. As the subject is vast, the book does not attempt to give a comprehensive survey of the field, but instead concentrates on a representative sample of results for a selected set of equations, ranging from the fundamental local and global existence theorems to very recent results, particularly focusing on the recent progress in understanding the evolution of energy-critical dispersive equations from large data. The book is suitable for a graduate course on nonlinear PDE. Readership Graduate students and research mathematicians interested in nonlinear partial differential equations.

Lecture notes for early lectures - Department of Mathematical Sciences Existence and Stability of Solitary and Periodic Travelling Wave Solutions Jaime Wave Equations, CBMS Regional Conference Series in Mathematics. Tao, T., Nonlinear dispersive equations: Local and global analysis, AMS-CBMS, 2007. **Bulletin of the American Mathematical Society** to Differential Equations, CBMS Regional Conference Series in Mathematics 65, [S-S] J. Shatah and M. 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