1. Record Nr. UNINA9910299765903321

Autore	Racke Reinhard
Titolo	Lectures on Nonlinear Evolution Equations : Initial Value Problems / / by Reinhard Racke
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Birkhäuser, , 2015
ISBN	3-319-21873-5
Edizione	[2nd ed. 2015.]
Descrizione fisica	1 online resource (315 p.)
Disciplina	510
Soggetti	Differential equations, Partial Partial Differential Equations Evolution equations, Nonlinear Initial value problems.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction -- 1. Global solutions to wave equations - existence theorems -- 2. L^p - L^q-decay estimates for the linear we equation -- 3. Linear symmetric hyperbolic systems -- 3.1 Energy estimates -- 3.2 A global existence theorem -- 3.3 Remarks on other methods -- 4. Some inequalities -- 5. Local existence for quasilinear symmetric hyperbolic -- 6. High energy estimates -- 7. Weighted a priori estimates -- 8. Global solutions to wave equations - proofs -- 8.1 Proof of Theorem 1.1 -- 8.2 Proof ot Theorem 1.2 -- 9. Other methods -- 10. Development of singularities -- 11. More evolutions equations -- 11.1 Equations of elasiticity -- 11.1.1 Initially isotropic media in R^3 -- 11.1.2 Initially cubic media in R^3 -- 11.2 Heat equations -- 11.3 Equations of thermoelasticity -- 11.4 Schrödinger equations -- 11.5 Klein-Gordon equations -- 11.6 Maxwell equations -- 11.7 Plate equations -- 12. Further aspects and questions -- 13. Evolution equations in waveguides -- 13.1 Nonlinear wave equations -- 13.1.1 Linear part -- 13.1.2 Nonlinear part -- 13.2. Schrödinger equations -- 13.3. Equations of elasticity and Maxwell equations -- 13.4 General waveguides -- Appendix -- A. Interpolation -- B. The Theorem of Cauchy-Kowalevsky -- C. A local existence theorem for hyperbolic-parabolic systems References Notation Index.

Sommario/riassunto

This book mainly serves as an elementary, self-contained introduction to several important aspects of the theory of global solutions to initial value problems for nonlinear evolution equations. The book employs the classical method of continuation of local solutions with the help of a priori estimates obtained for small data. The existence and uniqueness of small, smooth solutions that are defined for all values of the time parameter are investigated. Moreover, the asymptotic behavior of the solutions is described as time tends to infinity. The methods for nonlinear wave equations are discussed in detail. Other examples include the equations of elasticity, heat equations, the equations of thermoelasticity, Schrödinger equations, Klein-Gordon equations, Maxwell equations and plate equations. To emphasize the importance of studying the conditions under which small data problems offer global solutions, some blow-up results are briefly described. Moreover, the prospects for corresponding initial-boundary value problems and for open questions are provided. In this second edition, initial-boundary value problems in waveguides are additionally considered.