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|----|-------------------------|---|
| 1. | Record Nr.              | UNINA990004470790403321   |
|    | Autore                  | Chastenet, Jacques  |
|    | Titolo                  | L'enfance de la troisiemme : 1870-1879 / Jacques Chastenet  |
|    | Pubbl/distr/stampa      | s.l. : Librairie Hachette, 1952   |
|    | Descrizione fisica      | 358 p. ; 20 cm  |
|    | Collana                 | Histoire de la troisieme republique ; 1   |
|    | Localione               | FLFBC   |
|    | Collocazione            | 4/ V L 7  |
|    | Lingua di pubblicazione | Italiano  |
|    | Formato                 | Materiale a stampa  |
|    | Livello bibliografico   | Monografia  |
| 2. | Record Nr.              | UNINA9910781797803321   |
|    | Autore                  | Alshin A. B   |
|    | Titolo                  | Blow-up in nonlinear Sobolev type equations [[electronic resource] ] / Alexander B. Alshin, Maxim O. Korpusov, Alexey G. Sveshnikov |
|    | Pubbl/distr/stampa      | Berlin ; ; New York, : De Gruyter, c2011  |
|    | ISBN                    | 1-283-16682-8<br>9786613166821<br>3-11-025529-4   |
|    | Descrizione fisica      | 1 online resource (660 p.)  |
|    | Collana                 | De Gruyter series in nonlinear analysis and applications, , 0941-8183X ; ; 15   |
|    | Classificazione         | SK 540  |
|    | Altri autori (Persone)  | KorpusovM. O<br>SveshnikovA. G <1924-> (Aleksei Georgievich)  |
|    | Disciplina              | 515/.782  |
|    | Soggetti                | Initial value problems - Numerical solutions<br>Nonlinear difference equations<br>Mathematical physics                              |
|    | 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.  |

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## Nota di contenuto

Frontmatter -- Preface -- Contents -- Chapter 0 Introduction -- Chapter 1 Nonlinear model equations of Sobolev type -- Chapter 2 Blow-up of solutions of nonlinear equations of Sobolev type -- Chapter 3 Blow-up of solutions of strongly nonlinear Sobolev-type wave equations and equations with linear dissipation -- Chapter 4 Blow-up of solutions of strongly nonlinear, dissipative wave Sobolev-type equations with sources -- Chapter 5 Special problems for nonlinear equations of Sobolev type -- Chapter 6 Numerical methods of solution of initial-boundary-value problems for Sobolev-type equations -- Appendix A Some facts of functional analysis -- Appendix B To Chapter 6 -- Bibliography -- Index

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## Sommario/riassunto

The monograph is devoted to the study of initial-boundary-value problems for multi-dimensional Sobolev-type equations over bounded domains. The authors consider both specific initial-boundary-value problems and abstract Cauchy problems for first-order (in the time variable) differential equations with nonlinear operator coefficients with respect to spatial variables. The main aim of the monograph is to obtain sufficient conditions for global (in time) solvability, to obtain sufficient conditions for blow-up of solutions at finite time, and to derive upper and lower estimates for the blow-up time. The abstract results apply to a large variety of problems. Thus, the well-known Benjamin-Bona-Mahony-Burgers equation and Rosenau-Burgers equations with sources and many other physical problems are considered as examples. Moreover, the method proposed for studying blow-up phenomena for nonlinear Sobolev-type equations is applied to equations which play an important role in physics. For instance, several examples describe different electrical breakdown mechanisms in crystal semiconductors, as well as the breakdown in the presence of sources of free charges in a self-consistent electric field. The monograph contains a vast list of references (440 items) and gives an overall view of the contemporary state-of-the-art of the mathematical modeling of various important problems arising in physics. Since the list of references contains many papers which have been published previously only in Russian research journals, it may also serve as a guide to the Russian literature.

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