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| Autore | Conte Robert <1943-> |
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| Edizione | [Second edition.] |
| Descrizione fisica | 1 online resource (XXXI, 389 p. 15 illus., 6 illus. in color.) |
| Collana | Mathematical Physics Studies |
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| Soggetti | Painlevé equations Mathematical physics Differential equations, Partial |
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| Formato | Materiale a stampa |
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| Nota di contenuto | 1. Introduction -- 2. Singularity analysis: Painlevé test -- 3. Integrating ordinary differential equations -- 4. Partial Differential Equations: Painlevé test -- 5. From the test to explicit solutions of PDEs -- 6. Integration of Hamiltonian Systems -- 7. Discrete nonlinear equations -- 8. FAQ (Frequently asked questions) -- 9. Selected Problems Integrated by Painlevé functions. A. The classical results of Painlevé and followers. B. More on the Painlevé transcendents. C. Brief presentation of the elliptic functions. D. Basic introduction to the Nevanlinna theory. E. The bilinear formalism. F. Algorithm for computing the Laurent series. Index. |
| Sommario/riassunto | This book, now in its second edition, introduces the singularity analysis of differential and difference equations via the Painlevé test and shows how Painlevé analysis provides a powerful algorithmic approach to building explicit solutions to nonlinear ordinary and partial differential equations. It is illustrated with integrable equations such as the nonlinear Schrödinger equation, the Korteweg-de Vries equation, Hénon-Heiles type Hamiltonians, and numerous physically relevant examples such as the Kuramoto-Sivashinsky equation, the Kolmogorov-Petrovski-Piskunov equation, and mainly the cubic and quintic Ginzburg-Landau equations. Extensively revised, updated, and expanded, this new edition includes: recent insights from Nevanlinna |

theory and analysis on both the cubic and quintic Ginzburg-Landau equations; a close look at physical problems involving the sixth Painlevé function; and an overview of new results since the book's original publication with special focus on finite difference equations. The book features tutorials, appendices, and comprehensive references, and will appeal to graduate students and researchers in both mathematics and the physical sciences.
