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| Edizione | [1st ed. 2016.] |
| Descrizione fisica | 1 online resource (XIV, 285 p. 68 illus., 61 illus. in color.) |
| Collana | Universitext, , 0172-5939 |
| Disciplina | 515.353 |
| Soggetti | Differential equations, Partial Mathematical physics Partial Differential Equations Mathematical Applications in the Physical Sciences |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | 1. Introduction -- 2. Preliminaries -- 3. Conservation Equations and Characteristics -- 4. The Wave Equation -- 5. Separation of Variables -- 6. The Heat Equation -- 7. Function Spaces -- 8. Fourier Series -- 9. Maximum Principles -- 10. Weak Solutions -- 11. Variational Methods -- 12. Distributions -- 13. The Fourier Transform -- A. Appendix: Analysis Foundations -- References -- Notation Guide -- Index. |
| Sommario/riassunto | This modern take on partial differential equations does not require knowledge beyond vector calculus and linear algebra. The author focuses on the most important classical partial differential equations, including conservation equations and their characteristics, the wave equation, the heat equation, function spaces, and Fourier series, drawing on tools from analysis only as they arise. Within each section the author creates a narrative that answers the five questions: (1) What is the scientific problem we are trying to understand? (2) How do we model that with PDE? (3) What techniques can we use to analyze the PDE? (4) How do those techniques apply to this equation? (5) What information or insight did we obtain by developing and analyzing the PDE? The text stresses the interplay between modeling and mathematical analysis, providing a thorough source of problems and an inspiration for the development of methods. |

