

1. Record Nr.	UNINA9911019767303321
Autore	O'Neil Peter V
Titolo	Beginning partial differential equations [[electronic resource] /] / Peter V. O'Neil
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, c2008
ISBN	1-283-30616-6 9786613306166 1-118-03235-7 1-118-03060-5
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (493 p.)
Collana	Pure and applied mathematics
Classificazione	31.44 SK 540
Disciplina	515.353 515/.353
Soggetti	Differential equations, Partial Equations
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Beginning Partial Differential Equations; Contents; 1 First-Order Equations; 1.1 Notation and Terminology; 1.2 The Linear First-Order Equation; 1.3 The Significance of Characteristics; 1.4 The Quasi-Linear Equation; 2 Linear Second-Order Equations; 2.1 Classification; 2.2 The Hyperbolic Canonical Form; 2.3 The Parabolic Canonical Form; 2.4 The Elliptic Canonical Form; 2.5 Some Equations of Mathematical Physics; 2.6 The Second-Order Cauchy Problem; 2.7 Characteristics and the Cauchy Problem; 2.8 Characteristics as Carriers of Discontinuities; 3 Elements of Fourier Analysis 3.1 Why Fourier Series?3.2 The Fourier Series of a Function; 3.3 Convergence of Fourier Series; 3.4 Sine and Cosine Expansions; 3.5 The Fourier Integral; 3.6 The Fourier Transform; 3.7 Convolution; 3.8 Fourier Sine and Cosine Transforms; 4 The Wave Equation; 4.1 d'Alembert Solution of the Cauchy Problem; 4.2 d'Alembert's Solution as a Sum of Waves; 4.3 The Characteristic Triangle; 4.4 The Wave Equation on a Half-Line; 4.5 A Half-Line with Moving End; 4.6 A Nonhomogeneous Problem on the Real Line; 4.7 A General Problem on

a Closed Interval; 4.8 Fourier Series Solutions on a Closed Interval
4.9 A Nonhomogeneous Problem on a Closed Interval 4.10 The Cauchy Problem by Fourier Integral; 4.11 A Wave Equation in Two Space Dimensions; 4.12 The Kirchhoff-Poisson Solution; 4.13 Hadamard's Method of Descent; 5 The Heat Equation; 5.1 The Cauchy Problem and Initial Conditions; 5.2 The Weak Maximum Principle; 5.3 Solutions on Bounded Intervals; 5.4 The Heat Equation on the Real Line; 5.5 The Heat Equation on the Half-Line; 5.6 The Debate Over the Age of the Earth; 5.7 The Nonhomogeneous Heat Equation; 5.8 The Heat Equation in Two Space Variables; 6 Dirichlet and Neumann Problems
6.1 The Setting of the Problems 6.2 Some Harmonic Functions; 6.3 Representation Theorems; 6.4 Two Properties of Harmonic Functions; 6.5 Is the Dirichlet Problem Well Posed?; 6.6 Dirichlet Problem for a Rectangle; 6.7 Dirichlet Problem for a Disk; 6.8 Poisson's Integral Representation for a Disk; 6.9 Dirichlet Problem for the Upper Half-Plane; 6.10 Dirichlet Problem for the Right Quarter-Plane; 6.11 Dirichlet Problem for a Rectangular Box; 6.12 The Neumann Problem; 6.13 Neumann Problem for a Rectangle; 6.14 Neumann Problem for a Disk; 6.15 Neumann Problem for the Upper Half-Plane
6.16 Green's Function for a Dirichlet Problem 6.17 Conformal Mapping Techniques; 6.17.1 Conformal Mappings; 6.17.2 Bilinear Transformations; 6.17.3 Construction of Conformal Mappings between Domains; 6.17.4 An Integral Solution of the Dirichlet Problem for a Disk; 6.17.5 Solution of Dirichlet Problems by Conformal Mapping; 7 Existence Theorems; 7.1 A Classical Existence Theorem; 7.2 A Hilbert Space Approach; 7.3 Distributions and an Existence Theorem; 8 Additional Topics; 8.1 Solutions by Eigenfunction Expansions; 8.2 Numerical Approximations of Solutions; 8.3 Burger's Equation
8.4 The Telegraph Equation

Sommario/riassunto

A rigorous, yet accessible, introduction to partial differential equations-updated in a valuable new edition Beginning Partial Differential Equations, Second Edition provides a comprehensive introduction to partial differential equations (PDEs) with a special focus on the significance of characteristics, solutions by Fourier series, integrals and transforms, properties and physical interpretations of solutions, and a transition to the modern function space approach to PDEs. With its breadth of coverage, this new edition continues to present a broad introduction to the field, while also addre
