



### Partial Differential Equations with Numerical Methods

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TEXTS IN APPLIED MATHEMATICS

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This book treats basic theory of linear partial differential equations together with the most common methods for their numerical solution. It integrates the mathematical analysis of the differential equations with the theory of finite difference and finite element methods. For each type of partial differential equation, elliptic, parabolic, and hyperbolic, the text contains one chapter on the mathematical theory of the differential equation, followed by one chapter on finite difference methods and one on finite element methods. The chapters on elliptic equations are preceded by a chapter on the two-point boundary value problem for ordinary differential equations. Similarly, the chapters on parabolic and hyperbolic evolution problems are preceded by a chapter on the initial value problem for ordinary differential equations. There is also one chapter on the elliptic eigenvalue problem and eigenfunction expansion. The text would be suitable for advanced undergraduate and beginning graduate students of applied mathematics and engineering. The presentation does not presume a deep knowledge of mathematical and functional analysis. The required background on linear functional analysis and Sobolev spaces is reviewed in an appendix.

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