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An introduction to partial differential equations (with Maple). A concise course.  (English) [Zbl 07291790]

Publisher’s description: The book is designed for undergraduate or beginning level graduate students, and students from interdisciplinary areas including engineers, and others who need to use partial differential equations, Fourier series, Fourier and Laplace transforms. The prerequisite is a basic knowledge of calculus, linear algebra, and ordinary differential equations.

The textbook aims to be practical, elementary, and reasonably rigorous; the book is concise in that it describes fundamental solution techniques for first order, second order, linear partial differential equations for general solutions, fundamental solutions, solution to Cauchy (initial value) problems, and boundary value problems for different PDEs in one and two dimensions, and different coordinates systems. Analytic solutions to boundary value problems are based on Sturm-Liouville eigenvalue problems and series solutions.

The book is accompanied with enough well tested Maple files and some Matlab codes that are available online. The use of Maple makes the complicated series solution simple, interactive, and visible. These features distinguish the book from other textbooks available in the related area.

MSC:
35-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to partial differential equations
35Cxx Representations of solutions to partial differential equations
97I99 Analysis education

Software:
Maple

Full Text: DOI