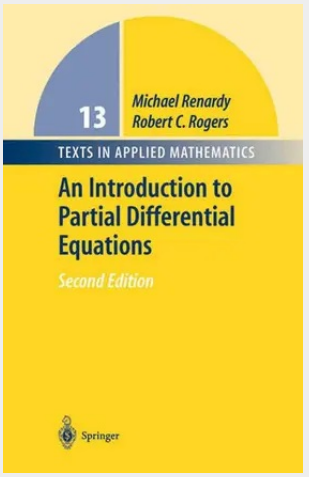
Renardy / Rogers

An Introduction to Partial Differential Equations



Partial differential equations are fundamental to the modeling of natural phenomena, arising in every field of science. Consequently, the desire to understand the solutions of these equations has always had a prominent place in the efforts of mathematicians; it has inspired such diverse fields as complex function theory, functional analysis and algebraic topology. Like algebra, topology, and rational mechanics, partial differential equations are a core area of mathematics.

This book aims to provide the background necessary to initiate work on a Ph.D. thesis in PDEs for beginning graduate students. Prerequisites include a truly advanced calculus course and basic complex variables. Lebesgue integration is needed only in Chapter 10, and the necessary tools from functional analysis are developed within the course. The book can be used to teach a variety of different courses. This new edition features new problems throughout and the problems have been rearranged in each section from simplest to most difficult. New examples have also been added. The material on Sobolev spaces has been rearranged and expanded. A new section on nonlinear variational problems with "Young-measure" solutions appears. The reference section has also been expanded.

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