FIRST-ORDER PARTIAL DIFFERENTIAL EQUATIONS

VOLUME I

THEORY AND APPLICATION OF SINGLE EQUATIONS

HYUN-KU RHEE,
RUTHERFORD ARIS, AND
NEAL R. AMUNDSON

First Order Partial Differential Equations Vol 1 Rutherford Aris

Hyun-Ku Rhee,Rutherford Aris,Neal R Amundson

First Order Partial Differential Equations Vol 1 Rutherford Aris:

First-Order Partial Differential Equations, Vol. 1 Hyun-Ku Rhee,Rutherford Aris,Neal R. Amundson,2014-05-05 This first volume of a highly regarded two volume text is fully usable on its own After going over some of the preliminaries the authors discuss mathematical models that yield first order partial differential equations motivations classifications and some methods of solution linear and semilinear equations chromatographic equations with finite rate expressions homogeneous and nonhomogeneous quasilinear equations formation and propagation of shocks conservation equations weak solutions and shock layers nonlinear equations and variational problems Exercises appear at the end of most sections This volume is geared to advanced undergraduates or first year grad students with a sound understanding of calculus and elementary ordinary differential equations 1986 edition 189 black and white illustrations Author and subject indices **First-Order Partial Differential Equations, Vol. 2** Hyun-Ku Rhee,Rutherford Aris,Neal R. Amundson,2013-05-17 Second volume of a highly regarded two volume set fully usable on its own examines physical systems that can usefully be modeled by equations of the first order Examples are drawn from a wide range of scientific and engineering disciplines The book begins with a consideration of pairs of quasilinear hyperbolic equations of the first order and goes on to explore multicomponent chromatography complications of counter current moving bed adsorbers the adiabatic adsorption column and chemical reaction in countercurrent reactors Exercises appear at the end of most sections Accessible to anyone with a thorough grounding in undergraduate mathematics ideally including volume 1 of this set 1989 edition 198 black and white illustrations Author and subject indices **Partial Differential Equations** BHAMRA, K. S.,Bhamra K. S.,2010-01-30 This book presents comprehensive coverage of the fundamental concepts and applications of partial differential equations PDEs It is designed for the undergraduate BA BSc Hons and postgraduate MA MSc students of mathematics and conforms to the course curriculum prescribed by UGC The text is broadly organized into two parts The first part Lessons 1 to 15 mostly covers the first order equations in two variables In these lessons the mathematical importance of PDEs of first order in physics and applied sciences has also been highlighted The other part Lessons 16 to 50 deals with the various properties of second order and first order PDEs The book emphasizes the applications of PDEs and covers various important topics such as the Hamilton Jacobi equation Conservation laws Similarity solution Asymptotics and Power series solution and many more The graded problems the techniques for solving them and a large number of exercises with hints and answers help students gain the necessary skill and confidence in handling the subject Key Features 1 Presents self contained topics in a cohesive style 2 Includes about 300 worked out examples to enable students to understand the theory and inherent aspects of PDEs 3 Provides around 450 unsolved problems with hints and answers to help students assess their comprehension of the subject

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