Mathematical Physics with Partial Differential Equations

Description: Mathematical Physics with Partial Differential Equations is for advanced undergraduate and beginning graduate students taking a course on mathematical physics taught out of math departments. The text presents some of the most important topics and methods of mathematical physics. The premise is to study in detail the three most important partial differential equations in the field - the heat equation, the wave equation, and Laplace's equation. The most common techniques of solving such equations are developed in this book, including Green's functions, the Fourier transform, and the Laplace transform, which all have applications in mathematics and physics far beyond solving the above equations. The book's focus is on both the equations and their methods of solution. Ordinary differential equations and PDEs are solved including Bessel Functions, making the book useful as a graduate level textbook. The book's rigor supports the vital sophistication for someone wanting to continue further in areas of mathematical physics.

- Examines in depth both the equations and their methods of solution
- Presents physical concepts in a mathematical framework
- Contains detailed mathematical derivations and solutions- reinforcing the material through repetition of both the equations and the techniques
- Includes several examples solved by multiple methods-highlighting the strengths and weaknesses of various techniques and providing additional practice

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