

Partial differential equations: analytical and numerical methods

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Abstrak

This introductory text on partial differential equations is the first to integrate modern and classical techniques for solving PDEs at a level suitable for undergraduates. The author successfully complements the classical topic of Fourier series with modern finite element methods. The result is an up-to-date, powerful, and flexible approach to solving PDEs, which both faculty and students will find refreshing, challenging, and rewarding. Linear algebra is a key component of the text, providing a framework both for computing solutions and for understanding the theoretical basis of the methods. Although techniques are emphasized over theory, the methods are presented in a mathematically sound fashion to develop a strong foundation for further study. Numerous exercises and examples involve meaningful experiments with realistic physical parameters, allowing students to use physical intuition to understand the qualitative features of the solutions.