

**Partial Differential Equations with Variable Exponents: Variational Methods and Qualitative Analysis** provides you with a thorough introduction to the theory of nonlinear partial differential equations (PDEs) with a variable exponent, particularly those of elliptic type.

The book presents the most important variational methods for elliptic PDEs described by nonhomogeneous differential operators and containing one or more power-type nonlinearities with a variable exponent. The authors give a systematic treatment of the basic mathematical theory and constructive methods for these classes of nonlinear elliptic equations as well as their applications to various processes arising in the applied sciences.

The analysis developed in the book is based on the notion of a generalized or weak solution. This approach leads not only to the fundamental results of existence and multiplicity of weak solutions but also to several qualitative properties, including spectral analysis, bifurcation, and asymptotic analysis.

The book examines the equations from different points of view while using the calculus of variations as the unifying theme. You will see how all of these diverse topics are connected to other important parts of mathematics, including topology, differential geometry, mathematical physics, and potential theory.

#### Features

- Provides a modern, unified approach to analyzing PDEs
- Presents elliptic equations with variable exponents from different viewpoints
- Demonstrates the power of Sobolev spaces in analysis
- Reveals a number of surprising interactions among various topics
- Covers applications in elasticity, heat diffusion, and other physical areas



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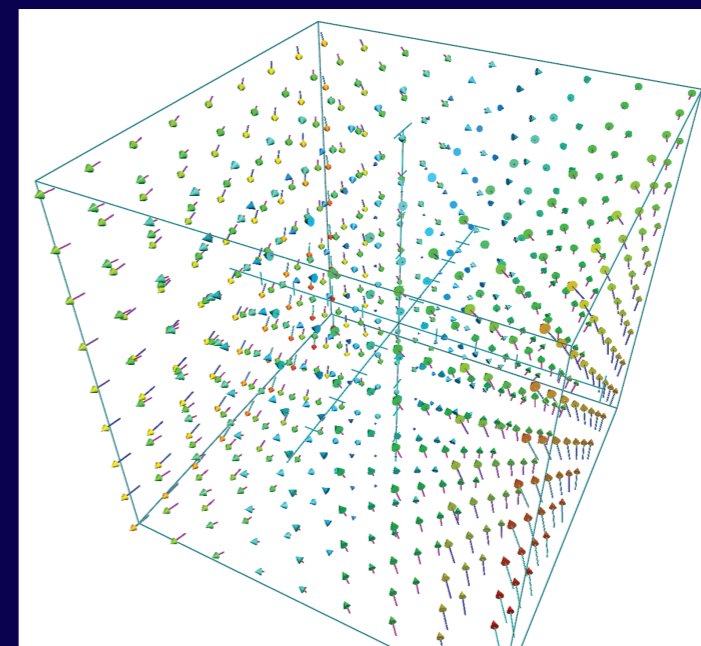
Partial Differential Equations  
with Variable Exponents

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# Partial Differential Equations with Variable Exponents

## Variational Methods and Qualitative Analysis



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