Título: Partial Differential Equations

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Sinopsis

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Partial Differential Equations: Topics in Fourier Analysis explains how to use the Fourier transform and heuristic methods to obtain significant insight into the solutions of standard PDE models. It shows how this powerful approach is valuable in getting plausible answers that can then be justified by modern analysis.

Using Fourier analysis, the text constructs explicit formulas for solving PDEs governed by canonical operators related to the Laplacian on the Euclidean space. After presenting background material, it focuses on:

Second-order equations governed by the Laplacian on Rn
The Hermite operator and corresponding equation
The sub-Laplacian on the Heisenberg group

Designed for a one-semester course, this text provides a bridge between the standard PDE course for undergraduate students in science and engineering and the PDE course for graduate students in mathematics who are pursuing a research career in analysis. Through its coverage of fundamental examples of PDEs, the book prepares students for studying more advanced topics such as pseudo-differential operators. It also helps them appreciate PDEs as beautiful structures in analysis, rather than a bunch of isolated ad-hoc techniques.