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Sommario/riassunto	This brief explores advanced signal processing techniques, focusing on signal decomposition, entropy analysis, and machine learning, with applications in energy-related fields such as hydroturbines, wind turbines, and power grids. It provides a detailed overview of methods for signal denoising and pattern recognition, covering techniques like wavelet transform, empirical mode decomposition, permutation entropy, and deep learning models. Through real-world engineering case studies, the book demonstrates how these methods enhance data analysis, improve fault detection, and optimize system performance, making it a valuable resource for researchers, engineers, and students in signal processing and mechanical engineering.