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Sommario/riassunto

This book uses a practical approach in the application of theoretical concepts to digital communications in the design of software-defined radio modems. The book discusses the design, implementation, and performance verification of waveforms and algorithms appropriate for digital data modulation and demodulation in modern communication systems. Using a building-block approach, the author provides an introduction to the advanced understanding of acquisition and data detection using source and executable simulation code to validate the communication system performance with respect to theory and design specifications. The author focuses on theoretical analysis, algorithm design, firmware and software designs, and subsystem and system testing. The book treats system designs with various channel characteristics from very low to optical frequencies. The book offers system analysis and subsystem implementation options for acquisition and data detection appropriate to the channel conditions and system specifications, and provides test methods for demonstrating system performance. This book also . Outlines fundamental system requirements and related analysis that must be established prior to a detailed subsystem design.. Includes many examples that highlight various analytical solutions and case studies that characterize various system performance measures.. Discusses various aspects of atmospheric propagation using the spherical 4/3 effective earth radius model.. Examines ionospheric propagation and uses the Rayleigh fading channel to evaluate link performance using several robust waveform modulations.. Contains end-of-chapter problems, allowing the reader to further engage with the text. Digital Communications with Emphasis on Data Modems is a great resource for communication system and digital signal processing engineers and students looking for in-depth theory and practical implementations.