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Nota di contenuto	Autonomous Software-Defined Radio Receivers for Deep Space Applications; Table of Contents; Foreword; Preface; Acknowledgments; Contributors; Chapter 1: Introduction and Overview; 1.1 Preliminaries; 1.1.1 Signal Model; 1.1.2 Anatomy of the Received Signal; 1.2 Radio Receiver Architectures; 1.2.1 A Conventional Radio Receiver; 1.2.2 Electra; 1.2.3 An Autonomous Radio; 1.3 Estimators and Classifiers of the Autonomous Radio; 1.3.1 Carrier Phase Tracking; 1.3.2 Modulation Classification; 1.3.3 Signal-to-Noise Ratio Estimation; 1.3.4 Frequency Tracking 1.4 An Iterative Message-Passing Architecture1.4.1 Messages from the Symbol-Timing Estimator; 1.4.2 Messages from the Phase Tracker; 1.4.3 Messages from the Modulation Classification; 1.4.4 Messages from the Decoder; 1.5 A Demonstration Testbed; References; Chapter 2: The Electra Radio; 2.1 Electra Receiver Front-End Processing; 2.1.1 AGC; 2.1.2 ADC; 2.1.3 Digital Downconversion and Decimation; 2.2 Electra Demodulation; 2.2.1 Frequency-Acquisition and Carrier-

Tracking Loop; 2.2.2 Navigation: Doppler Phase Measurement; 2.2.3 Symbol-Timing Recovery
2.2.4 Viterbi Node Sync and Symbol SNR Estimation2.3 Electra Digital Modulator; References; Chapter 3: Modulation Index Estimation; 3.1 Coherent Estimation; 3.1.1 BPSK; 3.1.2 M-PSK; 3.2 Noncoherent Estimation; 3.3 Estimation in the Absence of Knowledge of the Modulation, Data Rate, Symbol Timing, and SNR; 3.4 Noncoherent Estimation in the Absence of Carrier Frequency Knowledge; Chapter 4: Frequency Correction; 4.1 Frequency Correction for Residual Carrier; 4.1.1 Channel Model; 4.1.2 Optimum Frequency Estimation over an AWGN Channel
4.1.3 Optimum Frequency Estimation over a Raleigh Fading Channel4.1.4 Open-Loop Frequency Estimation; 4.1.5 Closed-Loop Frequency Estimation; 4.2 Frequency Correction for Known Data-Modulated Signals; 4.2.1 Channel Model; 4.2.2 Open-Loop Frequency Estimation; 4.2.3 Closed-Loop Frequency Estimation; 4.3 Frequency Correction for Modulated Signals with Unknown Data; 4.3.1 Open-Loop Frequency Estimation; 4.3.2 Closed-Loop Frequency Estimation; References; Chapter 5: Data Format and Pulse Shape Classification; 5.1 Coherent Classifiers of Data Format for BPSK
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5.3.2 Probability of Misclassification for Noncoherent BPSK

Sommario/riassunto

This book introduces the reader to the concept of an autonomous software-defined radio (SDR) receiver. Each distinct aspect of the design of the receiver is treated in a separate chapter written by one or more leading innovators in the field. Chapters begin with a problem statement and then offer a full mathematical derivation of an appropriate solution, a decision metric or loop-structure as appropriate, and performance results.