1. Record Nr. UNINA9910831023303321

Autore	Costa Nelson <1975->
Titolo	Multiple-input multiple-output channel models : theory and practice / / Nelson Costa, Simon Haykin
Pubbl/distr/stampa	Hoboken, New Jersey : , : Wiley, , c2010 [Piscataqay, New Jersey] : , : IEEE Xplore, , [2010]
ISBN	1-282-65652-X 9786612656521 0-470-59067-X 0-470-59066-1
Edizione	[1st edition]
Descrizione fisica	1 online resource (248 p.)
Collana	Adaptive and cognitive dynamic systems: signal processing, learning, communications and control ; ; 65
Altri autori (Persone)	HaykinSimon S. <1931->
Disciplina	621.382 621.384
Soggetti	MIMO systems Wireless communication systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface -- Chapter 1: Introduction -- 1.1 Historical Perspective -- 1.1.1 Electromagnetism -- 1.1.2 The Hertz Transmitter -- 1.1.3 Tesla and Wireless Power -- 1.1.4 Lodge and Tunable Circuits -- 1.1.5 Marconi and Trans-Atlantic Communication -- 1.2 MIMO Communications -- 1.3 MIMO Channel Models -- 1.3.1 The Channel Model Spectrum -- 1.3.2 Wideband MIMO Channel Models -- 1.4 Software Defined Radio -- 1.5 Overview -- 1.5.1 Chapter 2: Multiple Antenna Channels and Correlation -- 1.5.2 Chapter 3: Correlative Models -- 1.5.3 Chapter 4: Cluster Models -- 1.5.4 Chapter 5: Channel Sounding -- 1.5.5 Chapter 6: Experimental Validation -- 1.5.6 Appendices: Background and Definitions -- Chapter 2: Multiple Antenna Channels and Correlation -- 2.1 The Radio Channel: Definitions -- 2.1.1 The Physical Channel -- 2.1.2 The Analytical Channel -- 2.2 Channel Classifications -- 2.2.1 Linear Time-Invariant Channels -- 2.2.2 Time-Invariant Narrowband Channels -- 2.2.3 Time-Varying Wideband Channels and Bello's Model -- 2.2.4 The Tapped-

Delay Line Model and the Physical Channel -- 2.2.5 Narrowband Diversity Channels -- 2.2.6 The Narrowband MIMO Channel -- 2.2.7 The Wideband MIMO Channel -- 2.2.8 The Wideband MIMO Channel Recast Using Tensors -- 2.3 Summary of Channel Classifications -- 2.4 Second-Order Statistics of Multiple Antenna Channels -- 2.4.1 Second-Order Statistics of the Vector Channel -- 2.4.2 Second-Order Statistics of the Narrowband MIMO Channel -- 2.5 Second-order Statistics of the Wideband MIMO Channel -- 2.5.1 Eigenvalue Decomposition of the Wideband Correlation Matrix -- 2.6 Spatial Structure of Multiple Antenna Channels -- 2.6.1 SIMO Channels and Beamformers -- 2.6.2 MIMO Beamformers -- 2.7 Summary and Discussion -- 2.7.1 Channel Classifications -- 2.7.2 Multi-Antenna Channels -- 2.7.3 Spatial Structure and the APS -- 2.8 Notes and References -- 2.8.1 Channel Classifications -- 2.8.2 Second-Order Statistics of Multi-Antenna Channels -- 2.8.3 The Spatial Structure of Multi-Antenna Channels.
Chapter 3: Correlative Models -- 3.1 Vector Channel Synthesis from the Vector Correlation Matrix -- 3.2 Matrix Channel Synthesis from the Narrowband Correlation Matrix -- 3.2.1 Number of Model Parameters -- 3.3 One-Sided Correlation for Narrowband MIMO Channels -- 3.4 The Kronecker Model -- 3.4.1 The Narrowband Kronecker Model -- 3.4.2 The Wideband Kronecker Model -- 3.4.3 Notes on the Narrowband and Wideband Kronecker Models -- 3.5 The Weichselberger Model -- 3.5.1 The Vector Mode Model -- 3.5.2 H-matrix From Structured Vector Modes -- 3.6 The Structured Model -- 3.6.1 H-Tensor Synthesis from the Wideband Correlation Tensor -- 3.6.2 One-Sided Correlation for Wideband MIMO Channels. -- 3.6.3 Approximating the Wideband Correlation Matrix -- 3.6.4 Number of Parameters Comparison -- 3.7 Summary and Discussion -- 3.7.1 The Kronecker Model -- 3.7.2 The Weichselberger Model -- 3.7.3 The Structured Model -- 3.8 Notes and References -- 3.8.1 Correlative Models -- 3.8.2 Tensor Decomposition -- Chapter 4: Cluster Models -- 4.1 What is a Cluster? -- 4.2 The Saleh-Valenzuela Model -- 4.2.1 Model Summary -- 4.2.2 Model Implementation -- 4.2.3 Some Typical Parameters -- 4.3 Clusters in Time and Space -- 4.3.1 Azimuth, Elevation, and Delay Spreads -- 4.4 The Extended Saleh-Valenzuela Model -- 4.5 The COST 273 Model -- 4.5.1 Generic Channel Model -- 4.5.2 Environments -- 4.5.3 Receiver, Transmitter Placement -- 4.5.4 COST 273 Procedure -- 4.5.5 Features Not Yet Implemented and Omissions -- 4.5.6 Advantages/Disadvantages: COST 273 -- 4.6 The Random Cluster Model (RCM) -- 4.6.1 General Description -- 4.6.2 Determining the Environment PDF -- 4.6.3 Advantages/Disadvantages: The RCM -- 4.7 Summary and Discussion -- 4.8 Notes and References -- Chapter 5: Channel Sounding -- 5.1 Introduction -- 5.2 The WMSDR -- 5.2.1 Transmission -- 5.2.2 Reception -- 5.2.3 Timing and Carrier Offsets -- 5.3 Narrowband Channel Sounding -- 5.3.1 Periodic Pulse Sounding -- 5.3.2 Narrowband Single-Input, Single-Output Channel Sounding.
5.3.3 Narrowband MIMO Channel Sounding -- 5.4 Wideband Sounding: Correlative Sounding -- 5.4.1 ML-sequences -- 5.4.2 Cross-Correlation Using the FFT -- 5.4.3 Digital Matched Filters -- 5.5 Wideband Sounding: Sampled Spectrum Channel Sounding -- 5.6 Switched-array Architectures -- 5.7 Timing and Carrier Recovery -- 5.7.1 Digital Timing Recovery Methods -- 5.7.2 Phase Recovery Using a Decision Directed Feedback Loop -- 5.8 Summary and Discussion -- 5.9 Notes and References -- Chapter 6: Experimental Verifications -- 6.1 Validation Metrics -- 6.1.1 Channel Capacity -- 6.1.2 The Diversity and Correlation Metrics -- 6.1.3 The Demmel Condition Number -- 6.1.4 The Environmental Characterization Metric -- 6.1.5 Correlation

Matrix Difference Metric -- 6.2 WMSDR Experimental Setup -- 6.2.1 Terminology -- 6.2.2 Measurement Description -- 6.3 BYU Wideband Channel Sounder Experimental Setup -- 6.3.1 BYU Transmitter Set -- 6.3.2 BYU Receiver Set -- 6.3.3 Measurement Description -- 6.4 Experimental Results -- 6.4.1 Capacity Measure: Methodology -- 6.4.2 Results: MIMO APS and Spatial Structure -- 6.4.3 Results: Wideband Correlation Matrices -- 6.5 Discussion -- 6.5.1 Accuracy of the Results -- 6.5.2 Sources of Error -- 6.6 Summary and Discussion -- 6.7 Notes and References -- Appendix A: An Introduction to Tensor Algebra -- Appendix B: Proof of Theorems from Chapter 3 -- Appendix C: COST 273 Model Summary -- Glossary -- Bibliography -- Index.

Sommario/riassunto

A complete discussion of MIMO communications, from theory to real-world applications The emerging wireless technology Wideband Multiple-Input, Multiple-Output (MIMO) holds the promise of greater bandwidth efficiency and wireless link reliability. This technology is just now being implemented into hardware and working its way into wireless standards such as the ubiquitous 802.11g, as well as third- and fourth-generation cellular standards. Multiple-Input Multiple-Output Channel Models uniquely brings together the theoretical and practical aspects of MIMO communications, revealing ho