

1. Record Nr.	UNINA9910830064303321
Autore	Sun Haijian
Titolo	5G and Beyond Wireless Communication Networks
Pubbl/distr/stampa	Newark : , : John Wiley & Sons, Incorporated, , 2023 ©2023
ISBN	1-119-08949-2 1-119-08946-8
Edizione	[1st ed.]
Descrizione fisica	1 online resource (211 pages)
Collana	IEEE Press Series
Altri autori (Persone)	HuRose Qingyang QianYi
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Title Page -- Copyright -- Contents -- About the Authors -- Preface -- Acknowledgments -- Chapter 1 Introduction to 5G and Beyond Network -- 1.1 5G and Beyond System Requirements -- 1.1.1 Technical Challenges -- 1.2 Enabling Technologies -- 1.2.1 5G New Radio -- 1.2.1.1 Nonorthogonal Multiple Access (NOMA) -- 1.2.1.2 Channel Codes -- 1.2.1.3 Massive MIMO -- 1.2.1.4 Other 5G NR Techniques -- 1.2.2 Mobile Edge Computing (MEC) -- 1.2.3 Hybrid and Heterogeneous Communication Architecture for Pervasive IoTs -- 1.3 Book Outline -- Chapter 2 5G Wireless Networks with Underlaid D2D Communications -- 2.1 Background -- 2.1.1 MUMIMO -- 2.1.2 D2D Communication -- 2.1.3 MUMIMO and D2D in 5G -- 2.2 NOMAAided Network with Underlaid D2D -- 2.3 NOMA with SIC and Problem Formation -- 2.3.1 NOMA with SIC -- 2.3.2 Problem Formation -- 2.4 Precoding and User Grouping Algorithm -- 2.4.1 ZeroForcing Beamforming -- 2.4.1.1 First ZF Precoding -- 2.4.1.2 Second ZF Precoding -- 2.4.2 User Grouping and Optimal Power Allocation -- 2.4.2.1 First ZF Precoding -- 2.4.2.2 Second ZF Precoding -- 2.5 Numerical Results -- 2.6 Summary -- Chapter 3 5G NOMAEnabled Wireless Networks -- 3.1 Background -- 3.2 Error Propagation in NOMA -- 3.3 SIC and Problem Formulation -- 3.3.1 SIC with Error Propagation -- 3.3.2 Problem Formation -- 3.4 Precoding and Power

Allocation -- 3.4.1 Precoding Design -- 3.4.2 Case Studies for Power Allocation -- 3.4.2.1 Case I -- 3.4.2.2 Case II -- 3.5 Numerical Results -- 3.6 Summary -- Chapter 4 NOMA in Relay and IoT for 5G Wireless Networks -- 4.1 Outage Probability Study in a NOMA Relay System -- 4.1.1 Background -- 4.1.2 System Model -- 4.1.2.1 NOMA Cooperative Scheme -- 4.1.2.2 NOMA TDMA Scheme -- 4.1.3 Outage Probability Analysis -- 4.1.3.1 Outage Probability in NOMA Cooperative Scheme -- 4.1.4 Outage Probability in NOMA TDMA Scheme. 4.1.5 Outage Probability with Error Propagation in SIC -- 4.1.5.1 Outage Probability in NOMA Cooperative Scheme with EP -- 4.1.5.2 Outage Probability in NOMA TDMA Scheme with EP -- 4.1.6 Numerical Results -- 4.2 NOMA in a mmWaveBased IoT Wireless System with SWIPT -- 4.2.1 Introduction -- 4.2.2 System Model -- 4.2.2.1 Phase 1 Transmission -- 4.2.2.2 Phase 2 Transmission -- 4.2.3 Outage Analysis -- 4.2.3.1 UE 1 Outage Probability -- 4.2.3.2 UE 2 Outage Probability -- 4.2.3.3 Outage at High SNR -- 4.2.3.4 Diversity Analysis for UE 2 -- 4.2.4 Numerical Results -- 4.2.5 Summary -- Chapter 5 Robust Beamforming in NOMA Cognitive Radio Networks: Bounded CSI -- 5.1 Background -- 5.1.1 Related Work and Motivation -- 5.1.1.1 Linear EH Model -- 5.1.1.2 Nonlinear EH Model -- 5.1.2 Contributions -- 5.2 System and Energy Harvesting Models -- 5.2.1 System Model -- 5.2.2 Nonlinear EH Model -- 5.2.3 Bounded CSI Error Model -- 5.2.3.1 NOMA Transmission -- 5.3 Power MinimizationBased Problem Formulation -- 5.3.1 Problem Formulation -- 5.3.2 Matrix Decomposition -- 5.4 Maximum Harvested Energy Problem Formulation -- 5.4.1 Complexity Analysis -- 5.5 Numerical Results -- 5.5.1 Power Minimization Problem -- 5.5.2 Energy Harvesting Maximization Problem -- 5.6 Summary -- Chapter 6 Robust Beamforming in NOMA Cognitive Radio Networks: Gaussian CSI -- 6.1 Gaussian CSI Error Model -- 6.2 Power MinimizationBased Problem Formulation -- 6.2.1 BernsteinType Inequality I -- 6.2.2 Bernstein Type Inequality II -- 6.3 Maximum Harvested Energy Problem Formulation -- 6.3.1 Complexity Analysis -- 6.4 Numerical Results -- 6.4.1 Power Minimization Problem -- 6.4.2 Energy Harvesting Maximization Problem -- 6.5 Summary -- Chapter 7 Mobile Edge Computing in 5G Wireless Networks -- 7.1 Background -- 7.2 System Model -- 7.2.1 Data Offloading -- 7.2.2 Local Computing. 7.3 Problem Formulation -- 7.3.1 Update p_k , t_k , and f_k -- 7.3.2 Update Lagrange Multipliers -- 7.3.3 Update Auxiliary Variables -- 7.3.4 Complexity Analysis -- 7.4 Numerical Results -- 7.5 Summary -- Chapter 8 Toward Green MEC Offloading with Security Enhancement -- 8.1 Background -- 8.2 System Model -- 8.2.1 Secure Offloading -- 8.2.2 Local Computing -- 8.2.3 Receiving Computed Results -- 8.2.4 Computation Efficiency in MEC Systems -- 8.3 Computation Efficiency Maximization with Active Eavesdropper -- 8.3.1 SCABased Optimization Algorithm -- 8.3.2 Objective Function -- 8.3.3 Proposed Solution to P4 with given (k,k) -- 8.3.4 Update (k,k) -- 8.4 Numerical Results -- 8.5 Summary -- Chapter 9 Wireless Systems for Distributed Machine Learning -- 9.1 Background -- 9.2 System Model -- 9.2.1 FL Model Update -- 9.2.2 Gradient Quantization -- 9.2.3 Gradient Sparsification -- 9.3 FL Model Update with Adaptive NOMA Transmission -- 9.3.1 Uplink NOMA Transmission -- 9.3.2 NOMA Scheduling -- 9.3.3 Adaptive Transmission -- 9.4 Scheduling and Power Optimization -- 9.4.1 Problem Formulation -- 9.5 Scheduling Algorithm and Power Allocation -- 9.5.1 Scheduling Graph Construction -- 9.5.2 Optimal scheduling Pattern -- 9.5.3 Power Allocation -- 9.6 Numerical Results -- 9.7 Summary -- Chapter 10 Secure Spectrum Sharing with Machine Learning: An Overview -- 10.1

Background -- 10.1.1 SS: A Brief History -- 10.1.2 Security Issues in SS -- 10.2 MLBased Methodologies for SS -- 10.2.1 MLBased CRN -- 10.2.1.1 Spectrum Sensing -- 10.2.1.2 Spectrum Selection -- 10.2.1.3 Spectrum Access -- 10.2.1.4 Spectrum Handoff -- 10.2.2 Database Assisted SS -- 10.2.2.1 MLBased EZ Optimization -- 10.2.2.2 Incumbent Detection -- 10.2.2.3 Channel Selection and Transaction -- 10.2.3 MLBased LTEU/LTE-LAA -- 10.2.3.1 MLBased LBT Methods -- 10.2.3.2 MLBased Duty Cycle Methods. 10.2.3.3 GameTheoryBased Methods -- 10.2.3.4 Distributed AlgorithmBased Methods -- 10.2.4 Ambient Backscatter Networks -- 10.2.4.1 Information Extraction -- 10.2.4.2 Operating Mode Selection and User Coordination -- 10.2.4.3 AmBCCR Methods -- 10.3 Summary -- Chapter 11 Secure Spectrum Sharing with Machine Learning: Methodologies -- 11.1 Security Concerns in SS -- 11.1.1 Primary User Emulation Attack -- 11.1.2 Spectrum Sensing Data Falsification Attack -- 11.1.3 Jamming Attacks -- 11.1.4 Intercept/Eavesdrop -- 11.1.5 Privacy Issues in DatabaseAssisted SS Systems -- 11.2 MLAssisted Secure SS -- 11.2.1 StateoftheArt Methods of Defense Against PUE Attack -- 11.2.1.1 MLBased Detection Methods -- 11.2.1.2 Robust Detection Methods -- 11.2.1.3 MLBased Attack Methods -- 11.2.2 StateoftheArt Methods of Defense Against SSDF Attack -- 11.2.2.1 Outlier Detection Methods -- 11.2.2.2 ReputationBased Detection Methods -- 11.2.2.3 SSDF and PUE Combination Attacks -- 11.2.3 StateoftheArt Methods of Defense Against Jamming Attacks -- 11.2.3.1 MLBased AntiJamming Methods -- 11.2.3.2 Attacker Enhanced AntiJamming Methods -- 11.2.3.3 AmBC Empowered Anti Jamming Methods -- 11.2.4 StateoftheArt Methods of Defense Against Intercept/Eavesdrop -- 11.2.4.1 RLBased AntiEavesdropping Methods -- 11.2.5 StateoftheArt MLBased Privacy Protection Methods -- 11.2.5.1 Privacy Protection for PUs in SS Networks -- 11.2.5.2 Privacy Protection for SUs in SS Networks -- 11.2.5.3 Privacy Protection for ML Algorithms -- 11.3 Summary -- Chapter 12 Open Issues and Future Directions for 5G and Beyond Wireless Networks -- 12.1 Joint Communication and Sensing -- 12.2 SpaceAirGround Communication -- 12.3 Semantic Communication -- 12.4 DataDriven Communication System Design -- Appendix A Proof of Theorem 5.1 -- Bibliography -- Index -- EULA.
