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An Extensible Multi-layer Architecture Model Based on LEO-MSS and Performance Analysis 1873
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A Light-Weight Smartphone GPS Error Model for Simulation 1879
Ali Rostami, Bin Cheng, Hongsheng Lu, John B. Kenney, Marco Gruteser
A Transmitter Array Control Method for Suppressing Magnetic Field Leakage from Wireless Power Transfer Systems 1884
Daisuke Kobuchi, Yoshiaki Narusue, Yoshihiro Kawahara, Hiroyuki Morikawa
Angle and Waveform Estimation from Coarsely Quantized Array Data 1889
Heng Zhu, Fangqing Liu, Jian Li
Structured Sparse Matrix Sketching based Detection for Media-Based Modulation 1894
Rupali Gupta, Bharath Shamasundar, A. Chockalingam
Partial Enumerative Sphere Shaping 1899
Yunus Can Gultekin, W. J. Van Houtum, Arie Koppelaar, Frans M. J. Willems
Millimeter Wave Coverage and Blockage Duration Analysis for Vehicular Communications 1905
Caglar Tunc, Mustafa F. Ozkoc, Shivendra Panwar
Throughput Analysis of Incremental Redundancy Hybrid ARQ for FSO-Based Satellite Systems 1911
Hoang D. Le, Vuong V. Mai, Chuyen T. Nguyen, Anh T. Pham
KPI Impact on 5G NR Deep Sleep State Adaption 1916
Richard Tano, Martina Tran, Pal Frenger
Performance Analysis and Mitigation Method for I/Q Imbalance-Impaired Time Reversal-Based Indoor Positioning Systems 1921
Trung-Hien Nguyen, Sidney Golstein, Jerome Louveaux, Philippe De Doncker, Francois Horlin
Towards Practical Indoor Positioning Based on Massive MIMO Systems 1927
Mark Widmaier, Maximilian Arnold, Sebastian Dorner, Sebastian Cammerer, Stephan Ten Brink
Brain Storm Optimized Swarm Collaboration for Bus Scheduling 1933
Liangxi Liu, Siqing Ma, Jun Steed Huang
Robust Linear-Complexity Approach to Full SLAM Problems: Stochastic Variational Bayes Inference 1938
Xiaoyue Jiang, Hang Yu, Michael Hoy, Justin Dauwels
Three-Dimensional Cooperative Positioning in VANETs with LOS/NLOS Ranging Measurements 1943
Xianbo Jiang, Shengchu Wang
Performance of a Cooperative Network with Energy Harvesting Source and Relay 1948
Dileep Bapatla, Shankar Prakriya
GPS Calculated Distance Error Improvement by Planar Approximation of Pseudo Range in Many Skyscrapers Environments 1954
Toshinari Hayakawa, Norifumi Murai, Takatoshi Sugiyama
Dynamic Channel Bandwidth Use through Efficient Channel Assignment in IEEE 802.11ac Networks 1959
Anna Zakrzewska, Lester Ho
Performance Analysis of C-V2X Mode 4 Communication Introducing an Open-Source C-V2X Simulator 1965
Fabian Eckermann, Moritz Kahlert, Christian Wietfeld
A Sliding Window for Path Mapping Based on a Pseudo-Derivative Method in Autonomous Navigation 1970
Landon Bentley, Joe Macinnes, Hannah Mason, Rahul Bhadani, Tamal Bose
Implementation and Performance Evaluation of IEEE 802.11af Channel Aggregation 1974
Takeshi Matsumura, Kazuo Ibuka, Homare Murakami, Kentaro Ishizu, Fumihide Kojima
Scalable Sequence Design for UAV Cellular Networks with Down-Tilted Antennas 1980
Su Hyuk Moon, Chang Hwan Park, Yong Soo Cho
Wireless Powered UAV Relay Communications over the Fisher-Snedecoer f Fading Channels 1982
Peng Zhang, Hongyang Du, Yiyu Cao, Jiayi Zhang
Millimeter Wave Multiuser Beam Clustering and Iterative Power Allocation Schemes 1987
Li-Hsiang Shen, Kai-Ten Feng
Multi-Tier mmWave Networks: Improving Fairness for Spectrally-Efficient Downlink Scheduling 1992
Ziqi Chen, David B. Smith
Simulative Comparison of 4G/5G ITU Channel Models in the Context of V2I 1997
Thomas Deinlein, Reinhard German, Anatoli Djanatliev
Auto-Correlation Based Sensing of Multiple Wi-Fi BSSs for LTE-U CSAT 2002
Vanlin Sathya, Morteza Mehrnoush, Monisha Ghosh, Sumit Roy
Drone Detection and Classification Using Cellular Network: A Machine Learning Approach 2009
Muhammad Usman Sheikh, Fayezeh Ghavimi, Kalle Ruttik, Riku Jantti
Ray-Tracing Simulation of Cross-Road Scenarios Based on a Stochastic Model for Vehicular Traffic 2015
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DL-CFAR: A Novel CFAR Target Detection Method Based on Deep Learning 2020
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