Contents

Part I Satellite Navigation Signals

The Application of Fountain Code in Satellite Navigation System .... 3
Qiao Liu, Wenjing Zhang, Yong Wang and Hui Li

A Comprehensive Evaluation Approach of Navigation Signal Performance Based on Multi-attribute Group Decision Making .... 15
Qing Liu, Yanhong Kou and Zhigang Huang

Peak Position Detection-Based Acquisition Algorithm of Multiple Access Interference Resistance ......................... 29
Weina Hao and Jingyao Chen

Overall Performance Comparison of Three Dual-Frequency Constant Envelop Modulation Schemes for GNSS ............... 47
Yang Gao, Chunxia Li, Li Fu and Henglin Chu

Research and Performance Analysis of Constant-Envelope Multiplex for BD B2 Signals ................................. 57
Ming-gui Cai, Nan Qi and Jun Xie

An Improved Approach of SFAP Algorithm for Suppressing Concurrent Narrowband and Wideband Interference .............. 69
Yaohui Chen, Dun Wang, Peng Liu, Zhenxing Xu, Chanjuan Wei and Qijia Dong

Analysis and Simulation of Multi-beam Antenna Coverage for GEO Satellite Based on STK .......................... 81
Liangliang Guo, Yong Wei, Jianwen Li and Jun Zhao

Method of Navigation Message Broadcast Performance Analysis for GNSS ................................................. 93
Jinxian Zhao, Jinping Chen, Caibo Hu, Dongxia Wang, Zhixue Zhang, Chunxia Liu and Wei Zhao
A Novel Unambiguous W2 CCRW Multipath Mitigation Algorithm Applied to BOC \((n, n)\) Signals ........................................ 107
Shaojie Ni, Jing Pang, Kai Zhang, Chengtao Xu, Zhe Liu and Feixue Wang

Analysis and Correction of the Inter-frequency Clock Bias for BeiDou Satellites ........................................ 115
Lin Pan, Xiaohong Zhang, Jingnan Liu, Xingxing Li and Xin Li

Alternate Broadcasting Method of Navigation Message Among Satellites and Frequencies ............................. 129
Mengli Wang, Jinping Chen, Xiao Mao and Zhiqi Ma

Part II BDS/GNSS Augmentation Systems and Technology

Irregularities Detection and Bounding Variance Estimation in Ionospheric Grid Model ............................. 141
Dun Liu, Xiao Yu, Liang Chen and Jian Feng

A New Method for Multiple Outliers Detection in Receiver Autonomous Integrity Monitoring ...................... 151
Jun Zhao, Taogao Dai and Chen Chen

Reliability and Separability Analysis of Integrated GPS/BDS System ........................................ 165
Youlong Wu, Jinling Wang, Zhong Yang, Ling Yang and Gang Sun

Improving Extended Kriging with Chapman Model and Exponential Variation Function Model .................. 177
Pan Liu and Rui Li

The Analysis of Availability and Integrity for Beidou-Based High Precise KINRTK ................................. 189
Guanlong Wang, Xiaowei Cui and Mingquan Lu

Research on GPS RAIM Algorithm Using PF Based on PSO ........ 199
Ershen Wang, Rui Li, Tao Pang, Pingping Qu and Zhixian Zhang

Fingerprint Positioning Method of Satellite Signal Based on Probability Distribution ............................. 211
Li Yang, Di He, Peilin Liu and Wenxian Yu

Study and Experimental Analysis of Advanced RAIM Algorithm Based on BDS/GPS Multi-constellation .......... 221
Fei Niu, Pengfei Zhang, Junyi Xu and Meijun Fan

Signal-in-Space Accuracy Research of GPS/BDS in China Region .... 235
Si Sun and Zhipeng Wang
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Performance Testing Method of Optical Fiber Time Synchronization in BeiDou Ground-Based Navigation Signal Net</td>
<td>247</td>
</tr>
<tr>
<td>Tingsong Tang, Na Zhao, Yun Zhao, Xing Chen, Fengjuan Wu,</td>
<td></td>
</tr>
<tr>
<td>Zhen Qiu and Changjie Liu</td>
<td></td>
</tr>
<tr>
<td>The Improvement of the Positioning Accuracy in Search and Rescue with Two Satellites</td>
<td>255</td>
</tr>
<tr>
<td>YanRong Xue, ShaoJun Feng, Washington Yotto Ochieng,</td>
<td></td>
</tr>
<tr>
<td>Xin Zhang and ZhenJun Zhang</td>
<td></td>
</tr>
<tr>
<td>An Enhanced Global Positioning Technology and Precision</td>
<td>263</td>
</tr>
<tr>
<td>Verification of BDS</td>
<td></td>
</tr>
<tr>
<td>Jin Wang, Qin Zhang, Guanwen Huang, Rui Tu,</td>
<td></td>
</tr>
<tr>
<td>Wenju Fu and Pingli Li</td>
<td></td>
</tr>
<tr>
<td>Research and Application on Enhanced Reception Techniques</td>
<td>277</td>
</tr>
<tr>
<td>Based on Distributed Antennas in Ground Station</td>
<td></td>
</tr>
<tr>
<td>Ke Zhang, Zengjun Liu, Hang Gong, Zhicheng Lv, Xiangwei Zhu</td>
<td></td>
</tr>
<tr>
<td>and Guangfu Sun</td>
<td></td>
</tr>
<tr>
<td>Signal Design of High Accuracy Terrestrial Pseudolites System in BeiDou RDSS Frequency Band</td>
<td>291</td>
</tr>
<tr>
<td>Chenglong He and Baoguo Yu</td>
<td></td>
</tr>
<tr>
<td>Wireless Time Synchronization for Multiple UAV-Borne Pseudolites</td>
<td>303</td>
</tr>
<tr>
<td>Navigation System</td>
<td></td>
</tr>
<tr>
<td>Chenglong He, Baoguo Yu and Zhixin Deng</td>
<td></td>
</tr>
<tr>
<td>A Wide Area Differential Correction Algorithm Research</td>
<td>317</td>
</tr>
<tr>
<td>Adapted Differential Satellite Statuses</td>
<td></td>
</tr>
<tr>
<td>Wei Zhong, Yuanhao Yu and Hua Huang</td>
<td></td>
</tr>
<tr>
<td>Performance Analysis of INS-Aided GNSS Carrier Loop for Tracking Weak</td>
<td>327</td>
</tr>
<tr>
<td>Signal</td>
<td></td>
</tr>
<tr>
<td>Xuwei Cheng, Xiaqing Tang, Meng Wu, Junqiang Gao</td>
<td></td>
</tr>
<tr>
<td>and Shulei Chen</td>
<td></td>
</tr>
<tr>
<td>Part III Multi-sensor Fusion Navigation</td>
<td></td>
</tr>
<tr>
<td>The Multipath Fading Channel Simulation for Indoor Positioning</td>
<td>341</td>
</tr>
<tr>
<td>Shengchang Yu, Zhongliang Deng, Jichao Jiao, Shu Jiang, Jun Mo</td>
<td></td>
</tr>
<tr>
<td>and Fuhai Xu</td>
<td></td>
</tr>
<tr>
<td>Research on Ranging/GNSS Localization Based on Pollution</td>
<td>349</td>
</tr>
<tr>
<td>Collaborative Positioning via Adaptive Kalman Filter</td>
<td></td>
</tr>
<tr>
<td>Lin Zhang, Baowang Lian and Hao Yan</td>
<td></td>
</tr>
</tbody>
</table>
Dynamic Weighted Data Fusion Algorithm Based on TDOA/RSSI for Indoor Location .................................................. 365
Chenyang Zhai, Zhongliang Deng, Jichao Jiao, Ning Li, Yan Zhou and Cheng Li

Fast Acquisition Algorithm in GNSS/INS Ultra Tightly Integrated Navigation System Based on Steady State Judgment .............. 375
Wei He and Baowang Lian

Research on Horizontal Line Fitting Algorithm Based on Robust Estimation ............................................................... 383
Chonghui Li, Yabo Luo, Yong Zheng and Chao Zhang

A Weak Signal Acquisition Method for Indoor Passive Location on Mobile Communications ................................................. 397
Chuang Wang, Zhongliang Deng, Aihua Hu, Yao Zhang, Wei Zhao and Shuyue Dong

Review of Timing and Positioning with OFDM ......................... 409
Xin Zhao, Yong Wang, Yonghu Zhang, Yingxue Su, Xiangwei Zhu and Guangfu Sun

Performance Evaluation of Vehicle-Based POS by Hybrid Use of Total Station and Laser Tracker System ......................... 423
Yanglin Zhou, Guangyun Li, Shuaifeng Zhou, Jingyang Fu and Fengyang Li

The Experimental Study of MIMU/BeiDou Integrated Navigation System for Land Vehicle Applications in Highly Poor Weather Conditions ................................................................. 435
Dingjie Wang, Hanfeng Lv and Jie Wu

Reliability and Separability Analysis of Multiple-Fault Detection in Visual Navigation Using Reality-Based 3D Maps ............ 449
Zeyu Li and Jinling Wang

Partial State Feedback Correction for Smoothing Navigational Parameters ............................................................. 461
Zhenbo Liu, Naser El-Sheimy, Yongyuan Qin, Chunyang Yu and Jinliang Zhang

Simplified Ellipsoid Fitting-Based Magnetometer Calibration for Pedestrian Dead Reckoning ........................................... 473
Donghui Liu, Ling Pei, Jiuchao Qian, Lin Wang, Chengxuan Liu, Peilin Liu and Wenxian Yu

Velocity Prediction for Multi-rotor UAVs Based on Machine Learning ................................................................. 487
Rongzhi Wang, Danping Zou, Ling Pei, Peilin Liu and Changqing Xu
The Hybrid GNSS-Terrestrial Localization Method Based on the Augmented UKF ........................................ 501 Da-peng Li, Bing Liu, Yi Qu, Ting Liu, Ling-chuan Zeng and Ying-kui Gong

Research About Stereo Positioning Using Multi-source Remote Sensing Images ........................................ 513 Yingying Li, Hao Wu, Xiaokun Sun and Jie He

Crowdsourced Fingerprint Localization Using Virtual Radio Map ........................................ 527 Qiang Chang, Qun Li, Hongtao Hou, Weiping Wang and Wangxun Zhang

Navigation Source Selection Algorithm of Multisource Navigation System .................................................. 537 Zhengfa Shi, Yingkui Gong, Xinlin Zhou and Jiao Wang

Establishment and Verification of Enhancement Correction Model for Differential Barometric Altimetry ............ 549 Le Yang

Part IV PNT System and Emerging Navigation Technology

Design of the Performance Evaluation Software for X-ray Detectors ......................................................... 561 Dapeng Zhang, Wei Zheng, Yidi Wang and Lu Zhang

Research on Gridding Precision Evaluation Method of Geomagnetic Field Model ........................................ 571 Yang Chong, Hongzhou Chai, Yifeng Chang, Zongpeng Pan, Huarun Wang and Yuan Liu

Analysis on the Influence Factors to Atmospheric Polarization Navigation .................................................. 583 Yawen Ou, Pengfei Wu, Chaoli Tang and Heli Wei

A CFAR Detection Algorithm for X-ray Pulsar Signal Based on Time-Frequency Entropy ............................... 595 Lu Wang and Xizheng Ke

Research on Pulse Profile Stability of the X-ray Pulsar PSR B1509-58 ......................................................... 611 Lirong Shen, Xiaoping Li, Haifeng Sun, Haiyan Fang, Mengfan Xue and Jinpeng Zhu

Discovery and Theory of the Shadow Reference Points ................................................................................. 621 Xingang Feng and Dong Liu
A New Multichannel Acquisition Method for Navigation
Signal Based on Compound Carrier .......................... 631
Ruidan Luo, Ying Xu and Hong Yuan

Cycle Duty Design of Pulse Navigation Signal .......................... 649
Maoshu Zeng, Zhili He and Ying Xu
China Satellite Navigation Conference (CSNC) 2016
Proceedings: Volume II
Sun, J.; Liu, J.; Fan, S.; Wang, F. (Eds.)
2016, XVIII, 658 p. 323 illus., Hardcover