

ISSN 1001-506X  
CN 11-2422/TN



# 系统工程与电子技术

## Systems Engineering and Electronics

# 5

第43卷 第5期 2021年5月  
Vol.43 No.5 May 2021



- 美国工程索引 (EI) 收录
- 荷兰Scopus数据库收录
- 英国科学文摘 (INSPEC) 收录
- 日本科学技术振兴机构数据库 (JST) 收录
- 中文核心期刊要目总览收录
- 中国核心期刊 (遴选) 数据库收录
- 中国科技论文统计源期刊
- 中国科学引文数据库核心期刊

系统工程电子技术

第 43 卷 第 5 期

第 43 卷 第 5 期  
2021 年 5 月

目 次

· 电子技术 ·

基于虚拟阵元信号重构的嵌套阵稳健波束形成 .....  
 ..... 卢 建, 杨 剑, 侯 博, 余志勇, 刘光斌 1161

基于重构暗通道的二次正弦衰减的去雾算法 ..... 梅 葳, 李 昕 1169

基于多域网络的红外目标跟踪算法 .....  
 ..... 孙明杰, 周 林, 顾金玲, 李培庚 1176

跳频信号的相参与非相参积累时频差估计方法 .....  
 ..... 欧阳鑫信, 姚山峰, 杨宇翔, 贺 青, 万 群 1184

基于双重正则矩阵分解的缺失数据恢复 .....  
 ..... 刘 歌, 芮国胜, 田文飏 1191

· 传感器与信号处理 ·

基于 SNIC 的双时相 SAR 图像超像素协同分割算法 .....  
 ..... 马 倩, 邹焕新, 李美霖, 成 飞, 贺诗甜 1198

VDAS 中基于单目红外图像的深度估计方法 .....  
 ..... 李 旭, 丁 萌, 魏东辉, 吴晓舟, 曹云峰 1210

基于互协方差稀疏重构的 MIMO 雷达低仰角估计算法 .....  
 ..... 张子鑫, 胡国平, 周 豪, 占成宏 1218

基于注意力机制和改进 CLDNN 的雷达辐射源识别 .....  
 ..... 崔邦彦, 田润澜, 王东风, 崔 钢, 石静苑 1224

· 系统工程 ·

面向复杂仿真元建模的序贯近邻探索实验设计方法 .....  
 ..... 雷永林, 王 言, 于芹章, 朱 智, 董 微, 朱一凡 1232

基于 D-NSGA-III 算法的无人机群高维多目标任务分配方法 .....  
 ..... 周 晶, 赵晓哲, 许 震, 林 众, 张晓盼 1240

基于故障树的复杂装备模糊贝叶斯网络推理故障诊断 .....  
 ..... 陈洪转, 赵爱佳, 李腾蛟, 蔡勿聪, 程 硕, 徐春丽 1248

启发式前后向链条优化组合在轨多目标观测规划算法 .....	张晟宇, 孙煜坤, 朱振才, 胡海鹰	1262
改进的体系进化架构优化设计方法 .....	任天助, 辛万青, 严晞隽, 赵鸿宇, 黄 辉	1270
不确定条件下后装协同保障链优化调度 .....	曾 斌, 张泉先, 李厚朴	1277
基于相依网络和 SVM 的管制系统运行态势评估 .....	李 昂, 聂党民, 温祥西, 王泽坤, 杨诚修	1287

• 制导、导航与控制 •

基于偏置比例导引的落角约束滑模制导律 .....	王晓海, 孟秀云, 周 峰, 邱文杰	1295
基于北斗卫星校准的连接端站干涉测量与定轨 .....	樊 敏, 黄 勇, 黄 磊, 陈少伍, 李 赞	1303
基于信息复用和算法融合的初始对准方法 .....	徐志浩, 周召发, 常振军, 郭 琦	1310
可重复使用运载器多约束鲁棒预测校正制导 .....	都延丽, 刘 武, 唐明明, 王玉惠	1316
基于有限时间收敛干扰观测器的探导控一体化设计 .....	张跃坤, 贾晓洪, 张晓阳, 王炜强	1326
拦截主动防御目标的微分对策制导律 .....	张 浩, 张奕群, 张鹏飞	1335
三段判别域与最小二乘拟合的抗差滤波算法 .....	蔡保杰, 邵 雷	1346

• 通信与网络 •

低轨卫星通信中 SCMA 系统载波同步算法设计 .....		
.....	张嘉怡, 余忠洋, 朱 敏, 白宝明, 刘 为, 容琪龙	1354
卫星通信下行链路鲁棒安全波束成形设计 .....	顾晨伟, 林 志, 林 敏, 解路瑶, 欧阳键, 黄 硕	1361
改进 DenseNet 在电台建链行为识别时的可视化研究 .....	吴子龙, 陈 红, 雷迎科	1371
基于混合流量预测的虚拟网络拓扑重构方法 .....	史朝卫, 孟相如, 康巧燕, 苏玉泽	1382
降噪改进型多载波 CDSK 混沌通信系统 .....	张 刚, 和华杰, 张 鹏	1389
基于自适应形态学的跳频信号参数联合盲估计 .....	王曼颖, 龚晓峰, 雒瑞森, 边 彤, 王之远	1398
基于 FFT 谱能量检测和互相关检测的快速频谱感知方法及其性能分析 .....		
.....	常 虹, 赵小强, 石海杰	1406

• 可靠性 •

基于确信可靠性的功能、性能与裕量分析方法 .....	张清源, 文美林, 康 锐, 李泊远, 余 丽	1413
加速寿命数据的贝叶斯建模与分析 .....	汪建均, 杨桂康, 冯泽彪	1420
基于综合指标多阶段相似的发动机寿命预测 .....	赵洪利, 陈天铭, 郑 涅	1430

# Systems Engineering and Electronics

Vol.43 No.5

May 2021

## CONTENTS

### Electronic Technology

- Robust beamforming of nested array based on virtual elements signal reconstruction .....  
..... *LU Jian, YANG Jian, HOU Bo, YU Zhiyong, LIU Guangbin* 1161
- Dehazing algorithm based on reconstructed dark channel with quadratic sinusoidal attenuation .....  
..... *MEI Wei, LI Xin* 1169
- Infrared target tracking algorithm based on multi-domain network .....  
..... *SUN Mingjie, ZHOU Lin, GU Jinling, LI Peigeng* 1176
- Coherent and non-coherent integration TDOA/FDOA estimation method of frequency-hopping signals .....  
..... *OUYANG Xinxin, YAO Shanfeng, YANG Yuxiang, HE Qing, WAN Qun* 1184
- Missing data recovery based on double regularization matrix decomposition .....  
..... *LIU Ge, RUI Guosheng, TIAN Wenbiao* 1191

### Sensors and Signal Processing

- Super pixel cooperative segmentation algorithm for bi-temporal SAR image based on SNIC .....  
..... *MA Qian, ZOU Huanxin, LI Meilin, CHENG Fei, HE Shitian* 1198
- Depth estimation method based on monocular infrared image in VDAS .....  
..... *LI Xu, DING Meng, WEI Donghui, WU Xiaozhou, CAO Yunfeng* 1210
- Low elevation angle estimation algorithm for MIMO radar based on sparse reconstruction of cross-covariance  
..... *ZHANG Zixin, HU Guoping, ZHOU Hao, ZHAN Chenghong* 1218
- Radar emitter identification based on attention mechanism and improved CLDNN .....  
..... *CUI Bangyan, TIAN Runlan, WANG Dongfeng, CUI Gang, SHI Jingyuan* 1224

### Systems Engineering

- Design method of sequential neighbor exploratory experimental for complex simulation metamodeling .....  
..... *LEI Yonglin, WANG Yan, YU Qinzhang, ZHU Zhi, DONG Wei, ZHU Yifan* 1232
- Many-objective task allocation method based on D-NSGA-III algorithm for multi-UAVs .....  
..... *ZHOU Jing, ZHAO Xiaozhe, XU Zhen, LIN Zhong, ZHANG Xiaopan* 1240
- Fuzzy Bayesian network inference fault diagnosis of complex equipment based on fault tree .....  
..... *CHEN Hongzhuan, ZHAO Aijia, LI Tengjiao, CAI Congcong, CHENG Shuo, XU Chunli* 1248
- Heuristic optimized forward-backward chains combination method for on-board multi-targets observation  
planning ..... *ZHANG Shengyu, SUN Yukun, ZHU Zhencai, HU Haiying* 1262
- Improved system-of-systems optimization design method for evolutionary architecture .....  
..... *REN Tianzhu, XIN Wanqing, YAN Xijun, ZHAO Hongyu, HUANG Hui* 1270
- Optimal scheduling for cooperative support chain of logistics and equipment under uncertainty .....  
..... *ZENG Bin, ZHANG Quanxian, LI Houpu* 1277

Operation situation assessment of control system based on interdependent network and SVM .....  
..... *LI Ang, NIE Dangmin, WEN Xiangxi, WANG Zekun, YANG Chengxiu* 1287

### **Guidance, Navigation and Control**

Sliding mode guidance law with impact angle constraint based on bias proportional navigation .....  
..... *WANG Xiaohai, MENG Xiuyun, ZHOU Feng, QIU Wenjie* 1295

Using CEI for GEO orbit determination based on Beidou satellite calibration .....  
..... *FAN Min, HUANG Yong, HUANG Lei, CHEN Shaowu, LI Zan* 1303

Initial alignment method based on information reuse and algorithm fusion .....  
..... *XU Zhihao, ZHOU Zhaofa, CHANG Zhenjun, GUO Qi* 1310

Robust predictor-corrector guidance with multiple constraints for reusable launch vehicles .....  
..... *DU Yanli, LIU Wu, TANG Mingming, WANG Yuhui* 1316

Integrated design of detection guidance and control based on finite time disturbance observer .....  
..... *ZHANG Yuekun, JIA Xiaohong, ZHANG Xiaoyang, WANG Weiqiang* 1326

Differential game guidance law for intercepting the active defense target .....  
..... *ZHANG Hao, ZHANG Yiqun, ZHANG Pengfei* 1335

Robust filtering algorithm based on three discriminant domain and least squares fitting .....  
..... *CAI Baojie, SHAO Lei* 1346

### **Communications and Networks**

Design of carrier synchronization algorithm for SCMA system in LEO satellite communication .....  
..... *ZHANG Jiayi, YU Zhongyang, ZHU Min, BAI Baoming, LIU Wei, RONG Qilong* 1354

Robust secure beamforming design for the downlink of satellite communications .....  
..... *GU Chenwei, LIN Zhi, LIN Min, XIE Luyao, OUYANG Jian, HUANG Shuo* 1361

Visualization research on improved DenseNet applied to recognize a radio station's link establishment behavior .....  
..... *WU Zilong, CHEN Hong, LEI Yingke* 1371

Virtual network topology reconfiguration approach based on hybrid traffic prediction .....  
..... *SHI Chaowei, MENG Xiangru, KANG Qiaoyan, SU Yuze* 1382

Noise reduction improved multi-carrier CDSK chaotic communication system .....  
..... *ZHANG Gang, HE Huajie, ZHANG Peng* 1389

Joint blind parameter estimation of frequency hopping signal based on adaptive morphology .....  
..... *WANG Manying, GONG Xiaofeng, LUO Ruisen, BIAN Tong, WANG Zhiyuan* 1398

Joint FFT spectrum energy and correlation detection based fast spectrum sensing method and performance analysis .....  
..... *CHANG Hong, ZHAO Xiaoqiang, SHI Haijie* 1406

### **Reliability**

Function, performance and margin analysis method based on belief reliability .....  
..... *ZHANG Qingyuan, WEN Meilin, KANG Rui, LI Boyuan, YU Li* 1413

Bayesian modeling and analysis of accelerated life data .....  
..... *WANG Jianjun, YANG Guikang, FENG Zebiao* 1420

Engine life prediction based on multi-stage similarity of comprehensive index .....  
..... *ZHAO Hongli, CHEN Tianming, ZHENG Nie* 1430

