

2021 3rd International Conference on Intelligent Control, Measurement and Signal Processing and Intelligent Oil Field (ICMSP 2021)

**Xi'an, China
23 – 25 July 2021**



**IEEE Catalog Number: CFP21AV3-POD
ISBN: 978-1-6654-3716-5**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21AV3-POD
ISBN (Print-On-Demand):	978-1-6654-3716-5
ISBN (Online):	978-1-6654-3715-8

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

Double closed-loop control of converter based on active disturbance rejection	1
<i>Hongyi Peng, Ruoyan Pan, Zhimin Zhang, Zhen Li, Xiao Zhu, Zhenxiong Zhou</i>	
Constant Current Water Supply System Design Based on Fuzzy PID Control	8
<i>Cong Liu, Xuejie Feng, Lenian Xu, Chenglong Guo</i>	
Research on Fuzzy Control of Centrifugal Compressor Anti-surge in Long-distance Natural Gas Pipeline	13
<i>Lin Li, Yicheng Bai</i>	
Steering Stability Control of Four-wheel Hub Motor Driven Vehicle under Layered Control System	18
<i>Xian Li</i>	
Design of Array Electrode Sensor for Buried Oil Tank ECT System	22
<i>Lipin Li, Pengli Zhang, Xiaoyu Lei, Guochao Xu</i>	
Research and analysis of sensor performance in gas well flow measurement	26
<i>Ruirong Dang, Jingjing Liu, Menglin Tian, Ma Zhe</i>	
An optimized three-dimensional positioning algorithm for rssi-based wireless sensor network	30
<i>Yuxuan Xie</i>	
Design of Fiber-Optic F-P Pressure Sensor in Boreholes of Coal Mines	34
<i>Cong Lin</i>	
A new type of POTDR distributed optical fiber sensor	38
<i>Mian Zhang</i>	
Research on the Motion Law of Rod Pumps Based on Digital Twin Technology	42
<i>Fei Shen, Shuangshuang Ren, Xiangyang Zhang, Hongwu Luo, Minchao Feng, Zhanbao Fu</i>	
Time-Frequency Hybrid Suppression Method for Discrete Spectral Interference in Partial Discharge Signal	46
<i>Yuanlin Luo, Bo Zheng, Yuechao Wu, Jiong Lu</i>	
An Optimal Cooperative Navigation Algorithm based on Factor Graph for Pedestrians	51
<i>Mang Wang, Xianfei Pan, Langping An, Ze Chen, Zheming Tu, Chaoqun Chu</i>	
Network training and assessment platform for optical network instrument	57
<i>Wei Wang, Wei Song, Runqiao Liu, Yulong Zhu, Hao Gong, Hongfei Li</i>	
A Signal Reconstruction Method for Memory-Type Transient Electromagnetic Detection Systems in Horizontal Wells	63
<i>Dang Bo, Mengmeng Peng, Bowen Ren, Yang Ling</i>	
Research on Vision Positioning Algorithm of UAV Landing Based on Vanishing Point	68
<i>Quanzhou Huang, Peiyuan Feng</i>	

Design of remote group control system based on thermal environment of MODBUS launch vehicle	72
<i>Yijie Li, Hong Li, Pu Li, Ying Cheng</i>	
Secrecy Probability of a NOMA based FSO-RF Network with Amplify-and-Forward Relaying	77
<i>Yongzhi Zhuang, Jiliang Zhang</i>	
Metering Clock Enhancement Technology and New Service Applications Based on 5G Timing	83
<i>Shaocheng Wu, Yue Ma, Bo Wang, Xiaowei Chen, Zilin You, Shukai Hu, Zhiyuan Hu</i>	
Research on Application of industrial robot in grinding and polishing of hardware industry	88
<i>Yunxia Qi, Kun Han</i>	
A Randomized Algorithm for Approximating Truncated SVD	93
<i>Maboud F. Kaloorazi, Dan Wu, Guowang Gao</i>	
Research on Location Method Based on GNSS/IMU/LIDAR Multi-source Information Fusion	98
<i>Jingman Tang, Yali Zhang, Anran Li</i>	
FPGA Spread Spectrum Communication Method Based on M Sequence	103
<i>Jingtian Xu, Zhixuan Zhang</i>	
A real-time correction method for baseline wander of transient electromagnetic logging signals	108
<i>Dang Bo, Chenlu Zhang, Xiang Zhang, Lanqing Cheng</i>	
Secrecy Outage Analysis for Wireless-Powered IoT Relaying NOMA Networks over Nakagami-m Fading Channels	113
<i>Mengdie Han, Jiliang Zhang</i>	
Deep Residual Shrinkage Network For Few-Shot Learning	120
<i>Jiuzhou Liu, Qianwen Zhou, Biyin Zhang</i>	
Research and Analysis of Image Enhancement Algorithm in the Classification of Rock Thin Section Images	125
<i>Huaizhou Yang, Danyang Xu</i>	
Simulation Analysis of EMAT Shear Wave in Pipeline and Research of Defect Detection Characteristics	129
<i>Jie Wu, Chiyu Wang</i>	
Working Parameter Optimization of a Microstructure Electrohydrodynamic Jet Printing System by the Quantification of Margins and Uncertainties	134
<i>Kun Wang, Houyun Wang, Xiang Zhou, Sheng Yang</i>	
Design and Implementation of A Configurable Remote Analog Data Acquisition System Using the IEEE-1394B Bus	141
<i>Mingliang Hu, Jionghui Che, Fangchun Yu, Yang Li</i>	

An unambiguous acquisition algorithm for BOC modulated signals Based on weighting adjustment	147
<i>Pengtao Yang, Yubai Li, Jun Pan, Fei Wang, Lei Mao</i>	
High Resolution Remote Sensing Image Classification Using Hybrid Ensemble Learning	152
<i>Jiangbo Xi, Dashuai Xie, Wandong Jiang, Yaobing Xiang</i>	
Research for finite element simulation of array capacitance sensor	158
<i>Peng Luo, Lihong Zhao, Can Liu, Chao Huang</i>	
Research on fault reconstruction algorithm of electric shipboard power system	164
<i>Xinyue Zhang, Jianmei Xiao, Xihuai Wang</i>	
Anti interference transmission algorithm of wireless communication data in the last kilometer of substation	169
<i>Zhuxin Zhai, Xin Yan</i>	
Design of a Signal Regulating Circuit for Wearable ECG Sensor Applications	173
<i>Yuxiao Bai, Sujin He, Kai Wei</i>	
Airborne Lidar Point Cloud Classification fusing Spectral Information	177
<i>Guohong Chen, Qi Jin, Xuqing Zhang, Haiming Zhang</i>	
Optimized design of flaw detection method based on pulsed eddy current testing	185
<i>Xianwei Wu, Yifan Chen, Jialing Huang, Xue Li, Chenke Yin, Yang Hong, Xingwang Dai, Zhenghua Xu</i>	
Design and application of transmitter module of peep-hole instrument based on CLC2000	190
<i>Duibo Lin</i>	
Study of Receptive Spot Delivery Routing Problem based on Adaptive Large-scale Neighbor Search Algorithm	194
<i>Haoyang Li</i>	
An ECG pre-amplifier with 2.89 μW and 86.73dB CMRR	199
<i>Yixin Cao, Yixin Dai, Bohang Ye</i>	
Research on the time-domain response characteristics of RLC resonant circuit based on magnetostrictive transducer under sinusoidal excitation	204
<i>Zhouli Li, Qingbin Zhang, Jiatian Zhang, Kaikai Shi</i>	
Design of online traffic monitoring system based on STM32 and Lora	210
<i>Ruirong Dang, Jianyu Qiao</i>	
Theoretical and Experimental Research on Measuring Tension by Frequency Method Based on a Testing Machine	215
<i>Xuexiu Li, Dayu Zheng, Wenting Nie</i>	
Research on a Micro-Expression Recognition Algorithm based on 3D-CNN	221
<i>Yao Jiao, Mingli Jing, Yuliang Hu, Kun Sun</i>	

The design of ECG preamplifier for wearable device	226
<i>Longrui Han, Xinyu Li, Zewen Yang</i>	
A Low Power Low Noise ECG Amplifier Design based on OTA	230
<i>Long Chen, Junying He, Feiyu Ge</i>	
Dynamic Crypto Currency Transaction Index Modelling Using Blockchain and Community Detection Method	234
<i>Xiaoyan Xu, Beibei Zhang, Wei Lv, Wei Wei</i>	
Communication Fault Diagnosis Algorithm Based on BP Neural Network	239
<i>Shuying Shao</i>	
A Way of Generating True Random Number Based on FPGA and Gate Circuit Multi-vibrator	244
<i>Huanyin Zhou, Weiqi Huang, Jiewei Hu, Yanhui Xie, Zhazhan Lu, Feiyan Xu</i>	
Integration of Niching Technique and Surrogate-assisted Method with Particle Swarm Optimization for History Matching	249
<i>Xiaopeng Ma, Kai Zhang</i>	
Images super-resolution using improved generative adversarial networks	254
<i>Yuliang Hu, Mingli Jing, Yao Jiao, Kun Sun</i>	
Study of water saturation in electrically anisotropic media based on conductivity tensor	259
<i>Rong Geng, Yujue Gao, Xu Liu, Zhitao Zhang</i>	
Fracture Analysis of Stress Corrosion Cracking in Heat Exchanger Tubes	263
<i>Jinhui Zhai, Beibei Sun</i>	
Application and research progress of seawater heat exchanger	267
<i>Dazhang Yang, Yang Li, Qing Zhang, Jing Xie, Jinfeng Wang</i>	
Application of Intelligent Control Technology for Oilfield	271
<i>Dasheng Zhou, Qun Shen, Yanwei Wang, Wan Dong</i>	
Prediction Method of Heavy Oil Horizontal Well Cycle Oil Production Based on PCA and Gradient Boosting Decision Tree	276
<i>Hongbo Liu, Jianwei Gu, Yaxuan Wang, Zhiyong Wei</i>	
Study on the Ground Measurements of Key Parameters of Tubing Leakage Point in Sustained Annular Pressure Gas Well	281
<i>Feng Cao, Heng Luo, Ruirong Dang, Hui Feng Zheng</i>	
Tight Reservoirs Classification using Random Forest	
A Case Study of He 8 Member in Eastern Yan'an Gas Field	288
<i>Yan Wang, Ruogu Wang, Shengyi Yang, Jianping Liu</i>	
Application of the cable laying coiled tubing in electric submersible pump	293
<i>Jiatian Zhang, Jingtao Wan</i>	

Neural Network Optimized by Genetic Algorithm for Predicting Single Well Production in High Water Cut Reservoir	297
<i>Lei Zhang, Hongen Dou, Hongliang Wang, Yi Peng, Shaojing Zheng, Chenjun Zhang</i>	
Multi-coil array for long-distance cross-well electromagnetic detection	307
<i>Jingxin Dang, Qing Zhao, Cheng Guo, Jiadai Li, Lei Zhang, Bo Dang</i>	
Distributed temperature sensing technology for oil and gas Wells based on weak reflection Fiber Bragg Grating	312
<i>Xinrong Zhong, Min Yang, Lei Shi, Long Chai, Sai Ye</i>	
Anti-interference smoke fire detection technology in typical sacrificial places	317
<i>Chen Zhong, Xiaopeng Liu, Zhijia Tian, Haitao Li</i>	
Design of measuring device bracket for distance between elevator car and shaft wall	322
<i>Shuangchang Feng, Jie Chen, Wenhao Shen, Kun Fang</i>	
Design of real-time monitoring system for electric submersible pump based on stm32	326
<i>Ruirong Dang, Gan Li</i>	
The Synthesis And Evaluation of a High-Efficiency Crude Oil Pour Point Depressant	330
<i>Zhifeng Lv, Liming Wang, Ruimei Gao, Jiahui Xu, Guoyi Mou</i>	
The study of instrument recognition based on convolutional neural network	334
<i>Zetian Wang, Dan Wu, Le Hua, Suli Yan, Zhe Gao, Zhaoxue Wu</i>	
Planar Yagi MIMO Antenna Array with Improved Isolation for 5.8GHz WLAN Application	338
<i>Wanting Shen, Shaopeng Pan, Jinxin Li, Gaosheng Li</i>	
AC corrosion interference of buried long distance pipeline	342
<i>Lin Li, Xinyao Gao</i>	
Design of phase angle measurement system for single-phase line based on MATLAB	347
<i>Hongwei Qin, Ruirong Dang</i>	
Research on the calculation method of resistivity logging based on 2.5-D finite difference method	352
<i>Yujue Gao, Rong Geng, Xu Liu, Pengfei Wang</i>	
Research on Measurement Technology of Moisture Content by Radio Frequency Method Based on Helical Antenna	356
<i>Ruirong Dang, Li Zong, Pei Yang, Feng Cao</i>	
Optimization of intermittent oil production pattern based on data mining technology	361
<i>Wen Sun, Tao Ren, Xin Zhang, Hong Song</i>	
Noise Acquisition System of underwater propulsion device based on LabVIEW	365
<i>Zhouli Li, Feixiang Li, Fubin Tian, Yujia Liang</i>	

Design of an Ultrasonic Gas Flow Measurement Circuit Based on the Time-Difference Method	369
<i>Chenyu Dai</i>	
Application of digital dual-phase LIA in the detection of mineral oil in water	374
<i>Lipin Li, Guochao Xu, Yanqun Huang, Pengli Zhang</i>	
Design of a Low-power ECG Detecting Circuit	378
<i>Zhipeng Guo, Chuanbo Liu, Chenyu Zhao</i>	
Research on Gas Concentration Prediction Based on Wavelet Denoising and ARIMA Model	387
<i>Xiucui Guo, Lekun Yang, Penglin Guan, Meng Du</i>	
Design and Implementation of Linear Power Supply for Wireless Electromagnetic Wave MWD System	391
<i>Xiaochao Tian</i>	
Key technologies of intelligent interpretation cloud platform for coal mine logging	395
<i>Bici Jiang</i>	
Study on evaluation model of rate grade of soil corrosion for pipeline	399
<i>Zhifeng Zhao, Dan Wu, Guowang Gao, Heng Fan</i>	
Design of power monitoring system for 33MW DC submerged arc furnace based on PLC	403
<i>Ying Cheng, Chang Su, Hong Li</i>	
A skin effect correction method for hostile array compensated true resistivity tool (HCRT)	408
<i>Jie Wu, Jin Liu</i>	
Fault diagnosis of cooling pipeline system	412
<i>Yangsheng Peng, Yanqiao Chen</i>	
Circuit design of portable ECG equipment based on LM124 operational amplifier	416
<i>Zhiyuan Liu</i>	
Study on series voltage equalizing method of IGBT in high voltage circuits	423
<i>Jiahui Yang, Ke Cao, Hong Li</i>	
Application of Borehole Transient Electromagnetic System in Relief Well Drilling: a Case Study	427
<i>Changzan Liu, Yang Ling, Chenlu Zhang, Bo Dang</i>	
Simulation study on magnetic and acoustic dual effect for oil pipeline blockage removal	432
<i>Guowang Gao, Runsen Bai, Le Hua, Yulong Qu, Wei Yang, Dongliang Zhao</i>	
Simulation Study on Thickness Measurement Characteristics of Pipeline Axial Shear Wave based on EMAT	437
<i>Guowang Gao, Wei Yang, Yulong Qu, Le Hua, Dongliang Zhao, Runsen Bai</i>	

Research on Surfactants of Low Temperature and High Salt Oil Deposit Oil Displacement on Block D	441
<i>Xin Guo, Li MA, Jinxing Yang, Pan Xiao, Qihuo Huang</i>	
Application of Water Injection Profile Recognition Based on Machine Learning Method in F Oilfield	445
<i>Yiru Liu, Jianwei Gu, Zhijia Xu, Zhen Jiang</i>	
Establishment of simulation model of water injection pipeline cleaning technology and evaluation of cleaning effect	450
<i>Hui Li, Yan Ruan</i>	
Research on Decline Pattern Recognition of Hydraulic System	454
<i>Qi Ma, Dong Song, Bobing Liu</i>	
A shale gas exploitation platform detection and positioning method based on YOLOv5	459
<i>Chengyao Zhang, Xuqing Zhang, Minshui Wang, Hanyang Liu, Guohong Chen, Zongrui Gu</i>	
Pitot tube velocity measurement technology for the compressible airflow and its application in wind tunnel	465
<i>Zhaoxin Yang, Zhenghua Gu, Wenqing Zhang</i>	
Investigation on the Application of Parabolic Reflector in Plasma Logging Source	469
<i>Xiaolong Hao, Jing Zhou, Zhenyu Wang, Yifang Zhang</i>	
Application of High Intelligent Diagnosis System in Pumping Well	474
<i>Dasheng Zhou, Qun Shen, Yinming Zhi, Qiang Meng</i>	
Study on production stability of heterogeneous water and gas well: Take QXZ gas reservoir in Block SYS as an example	478
<i>Jing Luo, Xucheng Li, Jian Cao, Miaofeng Cui, Tingyu Wan, Lijun Ran</i>	
Productivity formula of horizontal well with gas and water production in ultra-high pressure and low permeability gas reservoir	482
<i>Chuyue Zhang, Jian Cao, Xucheng Li, Zhelun Zhang, Ning Wang, Liang Zhu</i>	
Study on Optimization of Comprehensive Energy System Planning Considering Energy Efficiency	487
<i>Ying Du, Haijing Zhang, Shenwang Mei, Yazhong Sun, Liang Song, Guoliang Li, Yongli Wang, Xu Han</i>	
Study on Quantitative Evaluation Standard of Fault Sealing Ability of Underground Gas Storage in Jizhong Depression	492
<i>Meilin Lv</i>	
Author Index	497