

2020 Ural Smart Energy Conference (USEC 2020)

**Ekaterinburg, Russia
13 – 15 November 2020**



**IEEE Catalog Number: CFP20X22-POD
ISBN: 978-1-7281-9707-4**

**Copyright © 2020 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:	CFP20X22-POD
ISBN (Print-On-Demand):	978-1-7281-9707-4
ISBN (Online):	978-1-7281-9706-7

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

Pages	Authors	Title
1-4	Viktor Bolgov, Dmitry Kalyuzhniy	Accuracy of Voltage Unbalance Source Assessment in Three-Phase Three-Wire Electrical Networks
5-8	Anna Arestova, Irina Frolova, Evgeny Sokol	Automated Power Distribution System Planning for Oil and Gas Industry
9-12	Vyacheslav Rybin, Georgii Kolev, Timur Karimov, Valerii Ostrovskii, Olga Druzhina, Maria Sigaeva	Estimating the Autonomy Range of the Battery-Powered Small Unmanned Surface Vehicle
13-16	Valeriy Tashchilin, Alina Stepanova	The Compensation of Current Transformer Saturation for Proper Protection Operation
17-20	Yuliya Zatsarinnaya, Denis Amirov, Maksim Elaev	Solar Panel Cleaning System Based on the Arduino Microcontroller
21-25	Aleksey Fedorov, Vladimir Petrov, Olga Afanasieva, Irma Zlobina	Limitations of Traveling Wave Fault Location
26-30	Anastasia Nikitina, Vladimir Petrov, Vladimir Naumov	Smart Power Swing Protection for the Line with Tap
31-34	Nikolay Ivanov, Vladislav Antonov, Alexander Soldatov, Marina Aleksandrova, Evgeny Vorobyev	An Optimal Strategy for Three-Phase Intelligent Auto-Reclosing of Power Lines with Shunt Reactors
35-38	Andrey N. Serov, Alexander A. Shatokhin, Nikolay A. Serov	Application of Instantaneous Power Spectral Representation for the Active Power Measurement
39-42	Anastasiya G. Rusina, Danil A. Serohvostov, Daniil I. Kolesnikov, Anna Arestova	PSCAD as a Tool for Development of a Simulation Model for a Power System with Renewable Energy Sources
43-46	Andrey N. Serov, Dmitry A. Chumachenko, Alexander A. Shatokhin	Application of Random Functions to Assess the Influence of Quantization Error on the Signal RMS
47-50	Yury Kazantsev, Gleb Glazyrin, Sergey Shayuk, Daria Tanfilyeva, Oleg Tanfilyev, Viktoriya Fyodorova	Hydro Unit Active Power Controller Minimizing Water Hammer Effect

51-54	Dmitry Chernskutov, Vladislav Popovtsev, Sergey Sarapulov	Analysis of SF6 Circuit Breakers Failures Related to Missing Current Zero. Part I.
55-58	Dmitry Chernskutov, Vladislav Popovtsev, Sergey Sarapulov	Analysis of SF6 Circuit Breakers Failures Related to Missing Current Zero. Part II.
59-62	Kamol Gulyamov, Rustam Yunusov, Sarfarozi Dovudov, Bohir Sharifov, Anvari Ghulomzoda, Murodbek Safaraliev	Increase in Power of DC/DC Converters with Increased Number of Conversion Channels
63-67	Vyacheslav A. Voronin, Fedor S. Nepsha	Modelling and Simulation of Scraper Face Conveyor Electric Drive
68-71	Vadim Zinurov, Marina Nikandrova, Vitaly Kharkov	Assessment of Thermal Storage Technologies in Energy Sector
72-75	Nikolay Ivanov, Vladislav Antonov, Vladimir Naumov, Alexander Soldatov, Marina Aleksandrova, Evgeny Vorobyev	A Damage Prevention of Circuit Breaker During Energizing of Low-loaded Line with Shunt Reactors
76-79	Julian Gaidukov, Gleb Glazyrin, Vladimir Glazyrin, Stanislav Eroshenko	Control Algorithms and Optimization Method of the Hydroelectric Power Plant's Microprocessing Joint Power Control
80-83	Yuri Soluyanov, Alexander Fedotov, Azat Akhmetshin, Vladimir Khalturin	Monitoring of Electrical Consumption, Including Self- Isolation During the COVID-19 Pandemic
84-87	Elena I. Gracheva, Oleg V. Naumov, Aleksei V. Beloglazov, Alexey N. Gorlov, Maxim A. Mikhaylov	Modeling the Reliability Characteristics of Contact Devices of Low-Voltage Grid
88-92	Ivan V. Popov, Georgy A. Evdokunin, Vladislav V. Popov	Influence of Transformer's Operating Mode for Value of Electrodynamical Force
93-96	Vadim Manusov, Muso Nazarov	Energy Consumption Conditions Optimization of the Autonomous System Based on Carbon-Free Energy
97-100	Nadezhda S. Buryanina, Yurii F. Korolyuk, Evdokiia I. Maleeva, Elena V. Lesnykh, Konstantin V. Suslov	High-speed Relay Equipment Protection

101-105	Yuri Bulatov, Andrey Kryukov, Konstantin Suslov	Static Aperiodic Stability Margins in Electrical Energy Systems with Distributed Generation: Operational Determining
106-109	Vyacheslav Zyryanov, Natalya Kiryanova, Igor Korotkov, Gleb Nesterenko, Gleb Prankevich, Gleb Prankevich	Analysis of Energy Storage Systems Application in the Russian and World Electric Power Industry
110-113	Varvara Guzhavina, Gleb Nesterenko, Gleb Prankevich, Dmitriy Gladkov, Vyacheslav Zyryanov, Julia Mokrousova	Experimental Accuracy Assessment of Energy Storage System Mathematical Model
114-117	Ghoziev Bakhtiyor, Vladislav O. Samoylenko, Andrew V. Pazderin	Demand Response Programs Influence On A Load Pattern
118-121	Leonid Plotnikov, Andrey Kozubsky, Alexander Maksimenko, Leonid Osipov	Evaluation of Operational and Environmental Indicators of Automobile Gas Piston Engines by Means of Mathematical Modeling
122-125	Leonid Plotnikov, Leonid Osipov	Improving the Operating Cycle of a Diesel Engine on Biofuel Based on Numerical Modeling
126-129	Nikolai G. Shubin, Kirill A. Krasilnikov, Mikhail I. Krasilnikov, Fedor S. Nepsha	Simulation of an Applied Microgrid Control System Based on a Digital Platform
130-133	Vladislav Antonov, Vladimir Naumov, Alexander Soldatov, Daria Stepanova	Fundamental Principles of Smart Protection Device
134-137	Vladislav Samoylenko, Pavel Ilyushin, Andrew Pazderin	Balancing Unpredictable Load and Intermittent Renewables by Semi-Dispatchable Distributed Generation
138-142	Andrei A. Achitaev, Stanislav A. Eroshenko, Anastasia G. Rusina, Alexey A. Zhidkov, Pavel N. Evseenkov	Landfill Gas Generation Projects Implementation
143-146	Aleksandra V. Tutueva, Timur I. Karimov, Valery S. Andreev, Alexander V. Zubarev, Ekaterina A. Rodionova, Denis N. Butusov	Synchronization of Chaotic Systems via Adaptive Control of Symmetry Coefficient in Semi-Implicit Models
147-150	Alexander N. Moiseichenkov, Pavel Y. Kovalenko, Mihail D. Senyuk, Valentin I. Mukhin	Synchronous Machine Adaptive Model for Power System Emergency Control and Technical State Diagnostic

151- 154	Pavel Y. Kovalenko, Mihail D. Senyuk, Valentin I. Mukhin, Diana D. Kornilova	Detection Event Inception Point Algorithms Based on Instantaneous Point-on-wave Measurements
155- 158	Pavel Y. Kovalenko, Mihail D. Senyuk, Valentin I. Mukhin, Diana D. Kornilova	Synchrophasor Evaluation Based on Point-on-Wave Measurements
159- 162	Alexey Romanov, Evgeniya Slepykina	Real-time Ethernet POWERLINK Communication for ROS. Part I. General Concept
163- 166	Alexey Romanov, Evgeniya Slepykina	Real-time Ethernet POWERLINK Communication for ROS. Part II. Hardware and Software
167- 171	Anna Arestova, Anastasiya Rusina	Games as Teaching Methods in Power Engineering Education
172- 175	Yuliya Zatsarinnaya, Alla Logacheva, Konstantin Suslov, Elena Stepanova	360-Degree Assessment of Training Efficiency in Power Engineering Sector
176- 179	Alexandra Khalyasmaa, Elena Zinovieva, Stanislav A. Eroshenko	Service Lifetime Analysis of Grid Companies' Plant Assets
180- 184	Alexandra Khalyasmaa, Elena Zinovieva	Sectoral Formation Features of The Utilities' Plant Assets Management Systems
185- 188	Alexandra Khalyasmaa, Elena Zinovieva	Analysis of Russian Experience in Utilities' Plant Assets Management