

Res Electricae Magdeburgenses

Magdeburger Forum zur Elektrotechnik

Editors

Zbigniew Styczynski

Nikolai Voropai

Vladimir Stepanov

Pio Lombardi

The power grid of the future

Proceedings No. 3

in the scope of the Russian Federation Decree No. 220

“Measures to Attract Leading Scientists to Russian Educational Institutions”

(Grant NO. № 11.G34.31.0044.)

Otto-von-Guericke-Universität Magdeburg

Magdeburg 2013

Content

Security modeling and estimation of active distribution electric networks	1
Methods for error minimization by experimental identification of power consumer parameters for higher harmonics	9
Synthesis and characterization of cross-linked organic-silicon composite membranes for PEM fuel cells	14
Identification of transmission line and power transformer parameters to optimize Smart Grid control	18
Use of Smart Grid technologies for optimal operation of railway power supply systems	22
Adaptive protection for Smart Grids with distributed generation	26
PMU for detection of a short-circuit location in the transmission line.....	32
Isolated power systems: problems and solution	37
Optimization of load daily curves of active consumers	42
Problem of cyber security in power supply systems	46
Protection selection against lightning overvoltages in wind energy installations in eastern Siberia	49
Optimal set up for full automatic measurements of polymer fuel cell membrane characteristics	52
Use of electric energy storage for energy balance in isolated power systems.....	57
Artificial neuronal networks for load forecasting applications	63
Mathematical model of multiphase power transmission lines.....	70
The use of capacitive energy storage for high speed deformation of a metal pipe	74