

# **International Conference on Energy, Power and Electrical Engineering 2016 (EPEE 2016)**

Advances in Engineering Research Volume 56

Shenzhen, China  
30 - 31 October 2016

## **Editors:**

**T. Muthuramalingam  
P. Kayal  
K.E. Abdelfattah Ahmed**

ISBN: 978-1-5108-3214-5

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2016) by Atlantis Press  
All rights reserved.  
<http://www.atlantis-press.com/php/pub.php?publication=epee-16>

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact the publisher:

Atlantis Press  
Amsterdam / Paris

Email: [contact@atlantis-press.com](mailto:contact@atlantis-press.com)

**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  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## ALTERNATIVE ENERGY AND THE ENVIRONMENT

<b>SUSTAINABLE AND RENEWABLE ENERGY APPLICATION: FROM GREEN BUILDINGS TO GREEN SUSTAINABILITY</b> .....	1
<i>Te Fu Chen, Tsai-fong Tan, Chieh-Heng Ko</i>	
<b>THE INTERACTION DESIGN OF OUTDOOR FITNESS FACILITIES BASED ON SOLAR ENERGY</b> .....	6
<i>Xiyin Gao, Yue Han, Ke Su</i>	
<b>WIND POWER ACCOMMODATION BY CHP BASED ON ELECTRIC BOILER AND HEAT ACCUMULATOR</b> .....	10
<i>Liguo Fan</i>	
<b>AUTOMATIC TRACKING SYSTEM OF SOLAR PANEL BASED ON SINGLE CHIP MICROCOMPUTER</b> .....	14
<i>Danping Jia, Yang Wang</i>	
<b>COMPREHENSIVE EVALUATION AND INFLUENCE FACTORS OF ENVIRONMENTAL POLLUTION IN MANUFACTURING INDUSTRY OF CHINA</b> .....	18
<i>Xiao'e Qu</i>	
<b>THE NUMERICAL SIMULATION AND STUDY ON GYMNASIUM INDOOR THERMAL ENVIRONMENT OF AIRPAK</b> .....	24
<i>Feng Qian, Li Yang</i>	
<b>THE EFFECT AND COUNTERMEASURES ON THE MISSILE EQUIPMENT IN HIGH TEMPERATURE AND DAMP ENVIRONMENT</b> .....	30
<i>Wengeng Pan, Tao Li, Hua Wan, Yijun Chen, Yanlei Zhang</i>	
<b>RESEARCH ON POISSON POINT PROCESS MODEL OF TRANSMISSION SYSTEM AND ITS RELIABILITY</b> .....	34
<i>Yonghua Zhu, Chenglin Chen, Tian Zhang</i>	
<b>THE RESEARCH OF ELECTRIC ENERGY MEASUREMENT ALGORITHM BASED ON S-TRANSFORM</b> .....	39
<i>Xiyang Ou, Bei He, Xiang Du, Jin Zhang, Ling Feng, Chang Ji, Wanjun Lei</i>	
<b>SPATIAL PATTERN AND FORECAST ANALYSIS OF URBANIZATION GROWTH RATES IN HENAN: 2011-2015</b> .....	45
<i>Kaiguang Zhang, Mingting Ba, Hongling Meng</i>	
<b>RESEARCH OF POTENTIAL DISTRIBUTION DEFECT ABOUT 220KV PORCELAIN-CLAD ARRESTER FOR HEAVY CONTAMINATION AREAS</b> .....	50
<i>Lina Geng, Yafeng Zhong, Hui Geng</i>	
<b>RESEARCH OF EQUIVALENT TESTING INTENSITY BETWEEN PROVING GROUNDS BASED ON RAIN-FLOW TECHNIQUE AND MINER THEOREM</b> .....	54
<i>Weiqiang Yue, Chuanxue Song</i>	
<b>WIND POWER FORECASTING BASED ON EXTENDED LATIN HYPERCUBE SAMPLING</b> .....	57
<i>Xianbing Ding, Minfang Peng, Meie Shen, Liang Zhu, Hongwei Che, Sheng Zhou, Guangming Li, Rongsheng Liu</i>	
<b>RESEARCH ON GREEN SYSTEMS OF THE HISTORICAL BUILDINGS PROTECTION</b> .....	61
<i>Li Yang, Feng Qian</i>	
<b>SYNTHESIS AND PHOTOCATALYTIC ACTIVITY OF <math>Ag_3VO_4</math> NPS DECORATED PAN NANOFIBERS</b> .....	66
<i>Jin-Pyo Lee, Prem Singh Saud, Mira Park, Hak-Yong Kim</i>	

## POWER GENERATION AND TRANSMISSION

<b>ANALYSIS ON WIND POWER PLANT VOLTAGE QUALITY AND DESIGN OF STATCOM CONTROL</b> .....	70
<i>Cai Liang, Tuo Liu, Li Ma, Shangdong Yang</i>	
<b>CONTROL OF A MULTI-TERMINAL VSC-HVDC SYSTEM FOR WIND POWER DELIVERY</b> .....	75
<i>Mohamed Tawfik Eladl, Yasser Gaber Dessouky, Ezz Eldien Zakzouk</i>	

<b>RESEARCH ON IGCC POWER GENERATION TECHNOLOGY USING HIGH SULFUR PET COKE .....</b>	<b>82</b>
<i>Hongtao Liu, Li Xue, Dengfeng Xu</i>	
<b>UNCERTAIN REASONING OF DISTRIBUTION NETWORK PLANNING FOR DISTRIBUTED GENERATOR .....</b>	<b>85</b>
<i>Jiong Yan, Fei Wang</i>	
<b>RISK ASSESSMENT OF DISTRIBUTION SYSTEMS WITH DISTRIBUTED GENERATION.....</b>	<b>89</b>
<i>Yuxiang Hou, Minfang Peng, Hongwei Che, Jingying Hou, Liang Zhu</i>	
<b>A NOVEL STABILIZATION METHOD OF THE ISLANDED DC MICROGRID .....</b>	<b>93</b>
<i>Zhonglin Yang, Xiaoming Zha, Leping Pu, Xuanfang Yang</i>	
<b>MODELING AND SIMULATION RESEARCH ON THE INFLUENCE OF DYNAMIC PROCESS OF EV CHARGING STATION ON TRANSIENT VOLTAGE STABILITY OF DISTRIBUTION NETWORK.....</b>	<b>96</b>
<i>Wenhuan Hao, Aina Tian, Yiyi Gao, Lize Ran</i>	
<b>REAL-TIME THREE-PHASE LINE LOSS CALCULATION FOR DISTRIBUTION NETWORK BASED ON ELECTRIC CHARACTERISTIC MEASURING TERMINAL.....</b>	<b>101</b>
<i>Jian Li, Chenxi Wang, Yuancan Zhuang, Jiangwen Yi</i>	
<b>RESEARCH ON THE CONTROL STRATEGY OF THE INTER-PROVINCIAL ELECTROMAGNETIC LOOP NETWORK IN HUBEI POWER GRID.....</b>	<b>107</b>
<i>Haiguang Liu, Defu Cai, Chu Zhou, Kan Cao, Wentao Huang, Hang Dong</i>	
<b>DISCUSSION ON SEVERAL SAFETY AND STABILITY PROBLEMS OF LARGE RECEIVING-END POWER GRID AFTER AC UHV ACCESS .....</b>	<b>111</b>
<i>Guangyao Yu, Tianhao Wang, Guodong Li, Jian Zhang, Zhiqiang Chong</i>	
<b>RESEARCH ON THE 220KV LINE SINGLE-PHASE RECLOSING TIME EFFECT ON THE STABILITY OF POWER GRID.....</b>	<b>114</b>
<i>Xinyuan Liu, Xiaojia Zhai, Huiping Zheng, Shuyong Song</i>	
<b>THE SECURITY AND STABILITY ANALYSIS OF 500KV WEST CHANNEL TO SHANXI DATONG POWER GRID .....</b>	<b>118</b>
<i>Xinyuan Liu, Xiaojia Zhai, Huiping Zheng, Weiwen Duan</i>	
<b>RESEARCH ON SYNCHRONOUS GRID-CONNECTED OF MICRO-GRID BY USING KALMAN FILTER .....</b>	<b>122</b>
<i>Xiaobing Xu, Bing Li, Jianping Wang, Chengqiang Zheng, Xiaojia Qin, Wei Sun, Qin Wang</i>	
<b>A NEW ISLANDING DETECTION METHOD FOR GRID CONNECTED PV SYSTEM .....</b>	<b>127</b>
<i>Ke Jia, Hongsheng Wei, Yaoqi Lin, Yujin Wang, Guoqing He, Bohan Liu</i>	
<b>CONTROL STRATEGY OF ENERGY STORAGE BUFFER SYSTEM FOR CHARGING STATION WITH V2G FUNCTION.....</b>	<b>134</b>
<i>Shuguang Liu, Huawei Xie, Wenpu Zhao</i>	
<b>APPLICATION AND RESEARCH OF INTEGRATED MODEL BETWEEN SUBSTATION AND DISPATCH CENTER.....</b>	<b>139</b>
<i>Ning Jiang, Lin Li, Ning Kang, Guodong Li, Lingxu Guo, Jian Chen</i>	
<b>APPLICATION AND RESEARCH OF INTEGRATED INFORMATION EXCHANGE SYSTEM BETWEEN SUBSTATION AND DISPATCH CENTER.....</b>	<b>145</b>
<i>Ning Jiang, Lin Li, Yao Wang, Guodong Li, Lingxu Guo, Jian Chen</i>	
<b>EFFECTS OF HARMONIC POLLUTION ON ELECTRICAL THREE-PHASE POWER TRANSFORMERS.....</b>	<b>151</b>
<i>E. Darie, R. Pecsi</i>	
<b>TRANSFORMER HEALTH STATUS EVALUATION METHOD BASED ON THE ASSOCIATION RULE AND ANALYTIC HIERARCHY PROCESS.....</b>	<b>156</b>
<i>Xun Wan, Kunyu Tan, Yun Liu, Huisheng Ye, Shihua Zhao, Ping Peng, Minfang Peng</i>	
<b>DEEP PEAK LOAD REGULATION COMPENSATION MECHANISM OF THERMAL POWER UNITS INCORPORATING THE CHANGE OF OBJECT AND THE CAPABILITY OF SUBJECT OF PEAK LOAD REGULATION .....</b>	<b>162</b>
<i>Zhen'an Zhang, Junzhe Lei, Zicheng Zhou, Quansheng Zhu, Haixia Wang, Quan Lv, Weidong Li</i>	
 <b><u>ELECTRICAL MACHINES, POWER ELECTRONICS AND INDUSTRY APPLICATIONS</u></b>	
<b>DESIGN AND REALIZATION OF AC CHARGING SPOT FOR ELECTRIC VEHICLES .....</b>	<b>169</b>
<i>Shuguang Liu, Gang Cheng, Huawei Xie</i>	
<b>MODELING SCHEME OF SUPERVISORY CONTROL SYSTEM FOR ELECTRIC VEHICLE CHARGING STATION BASED ON IEC61850.....</b>	<b>173</b>
<i>Shuguang Liu, Wenbin Lu, Huawei Xie</i>	

<b>STUDY OF SVM-DTC STRATEGY ON DRIVE MOTOR OF CABLE WINCH</b> .....	177
<i>Lawu Zhou, Xiong Deng, Bonan An, Jun Gao</i>	
<b>ELECTRIC POWER BIG DATA AND ITS APPLICATIONS</b> .....	181
<i>Defu Cai, Hongxun Tian, Yi Wang, Honggang Wang, Haifeng Zheng, Kan Cao, Chu Zhou</i>	
<b>THE ECONOMIC ANALYSIS ON THE ELECTRIC UNIVERSAL SERVICES</b> .....	185
<i>Jianhui Liao</i>	
<b>ENHANCEMENT OF POWER SYSTEM DYNAMICS THROUGH STATCOM</b> .....	188
<i>Narendra Kumar, Vipin Jain</i>	
<b>RESEARCH ON INFINITE BUS SYSTEM MODEL IN THE POWER SYSTEM DYNAMIC SIMULATION</b> .....	192
<i>Fengge Zhang, Dexian Yang</i>	
<b>CAPITAL STRUCTURE EVALUATION MODEL ON PPP POWER PROJECTS</b> .....	195
<i>Liping Wang, Pu Zhang, Yi Liu, Yi Wang, Hongbing Wang</i>	
<b>CONTRADICTION BETWEEN ELECTRIC POWER MARKET-ORIENTED REFORM AND SUSTAINABLE DEVELOPMENT: EVIDENCE FROM CHINA</b> .....	199
<i>Shuo Yin, Jing Yan, Hongkun Bai, Jiangbo Wang, Dawei Song, Junhui Liu</i>	
<b>THE FEASIBILITY ANALYSIS OF COMMUNICATION SERVICE MODEL FOR POWER WIRELESS PRIVATE NETWORK WITH 4G TECHNOLOGY</b> .....	203
<i>Hao Zhang, Jiming Yao, Hao He, Xin Li</i>	
<b>CONDITION ASSESSMENT OF HIGH VOLTAGE CIRCUIT BREAKER OPERATING MECHANISM BASED ON COIL CURRENT WAVEFORM</b> .....	207
<i>Xiaoli Duan, Hongcai Lei, Min Fan, Lihua Zhao, Rongrong Fu, Qiang Rong, Hao Zhang, Zhong Wang</i>	
<b>DESIGN AND IMPLEMENTATION OF MOBILE INTELLIGENT TERMINAL NETWORK COMMUNICATION IN SMART HOME</b> .....	213
<i>Shulin Yang, Nan Yang, Jieping Hu, Guyang Wang</i>	
<b>THE DESIGN OF MICRO PERMANENT MAGNETIC SYNCHRONOUS MACHINE CONTROL SYSTEM BASED ON DSP</b> .....	216
<i>Jin Chen, Xiaogang Xie, Mengjia Dai</i>	
<b>CAPACITANCE OF <math>MnO_2</math> MICRO-FLOWERS DECORATED CNFSIN ALKALINE ELECTROLYTE AND ITS BI-FUNCTIONAL ELECTROCATALYTIC ACTIVITY TOWARD HYDRAZINE OXIDATION</b> .....	220
<i>Seong-Min Ji, Zafar Khan Ghouri, Mira Park, Hak Yong Kim</i>	
<b>THE ELECTROMAGNETIC PROTECTION METHOD ON THE GUIDED AMMUNITION</b> .....	224
<i>Wengeng Pan, Hua Wan, Guangrong Bian, Hu Chao</i>	
<b>ANALYSIS OF FRACTURE POROSITY OF COALBED WITH NMR EXPERIMENTS AND RESISTIVITY LOGGING DATA</b> .....	228
<i>Mingshun Zhou, Xiao Liang, Lin Ai, Diren Liu</i>	
<b>APPLICATION OF MATHEMATICAL MORPHOLOGY IN GIS PD SIGNAL ANALYSIS</b> .....	232
<i>Qi Liu, Qiang Gao</i>	
<b>THE DESIGN OF ETC SYSTEM BASED ON RFID AND IMAGE IDENTIFICATION</b> .....	236
<i>Zhaoxia Tang</i>	
<b>PARASITE OVUM AUTOMATIC RECOGNITION IN THE HIGH NOISE OF MICROSCOPIC IMAGE</b> .....	241
<i>Fengshou Zhang, Xin Meng, Zhigang Hu, Siwen Li</i>	
<b>CAMOUFLAGE EFFECT EVALUATION OF PATTERN PAINTING BASED ON MOVING OBJECT DETECTION</b> .....	244
<i>Xianhui Rong, Qi Jia, Weidong Xu, Xuliang Lv, Jianghua Hu</i>	
<b>A STUDY ON CROWDSOURCING GEOSPATIAL DATA MINING BASED ON SPATIAL STATISTICS</b> .....	248
<i>Jiyuan Geng, Weidong Song, Shangyu Sun</i>	
<b>UNDERGROUND PIPELINES WIRELESS SENSOR LNA CIRCUIT DESIGN AND SIMULATION BASED ON ADS</b> .....	252
<i>Zhengshan Xu, Changwen Liu, Tao Chen, Fan Yang, Xu Wang</i>	
<b>MMC-STATCOM CONTROL SYSTEM RESEARCH BASED ON EQUIVALENT PARAMETER MODEL AND CARRIER PULSE PHASE-SHIFTING MODULATION</b> .....	255
<i>Hui Chen, Yukun Sun, Weiwei An, Yonghong Huang</i>	
<b>THE ANALYSIS OF GIS DEFECT MODEL PARTIAL DISCHARGE TEST</b> .....	261
<i>Liqiang Liu, Jiao Wang</i>	
<b>AN IMPROVED FORMATION CONTROL ALGORITHM IN VICON 3D MOTION CAPTURE SYSTEM</b> .....	268
<i>Qiu Tang, Chenxiao Cai, Lei Ma</i>	

<b>FABRIC DEFECT IDENTIFICATION BASED ON 2D EMPIRICAL MODE DECOMPOSITION .....</b>	<b>274</b>
<i>Shuaijun Wang, Ye Yuan, Hongli Dun</i>	
<b>THE APPLICATION OF 3D LASER SCANNING METHOD IN MONITORING THE QUALITY OF PRESSURE VESSEL.....</b>	<b>278</b>
<i>Huizeng Yin, Xinwei Yang, Ruilan Tian, Xiuzhi Sui</i>	
<b>INTERACTION DESIGN OF SMART HOME MOBILE CONTROL TERMINAL .....</b>	<b>281</b>
<i>Jieping Hu, Nan Yang, Shulin Yang, Bin Wang</i>	
<b>FUNCTION PROJECTIVE LAG SYNCHRONIZATION OF HYPERCHAOTIC SYSTEMS VIA IMPULSIVE CONTROL.....</b>	<b>284</b>
<i>Jingui Liu</i>	
<b>DYNAMIC PERFORMANCE SIMULATION OF HYBRID EXCITATION CLAW-POLE ALTERNATOR.....</b>	<b>288</b>
<i>Jiapeng Li, Changqing Zhu, Min Cong, Yiming Shen</i>	
<b>DESIGN OF DIGITAL FAST CORRECTOR POWER SUPPLY FOR TPS STORAGE RING .....</b>	<b>293</b>
<i>YuanChen Chien, BaoSheng Wang, YongSeng Wong, ChenYao Liu, KuoBin Liu</i>	
<b>MTG: A HIGH-SPEED MALICIOUS TRAFFIC GENERATING METHOD AND IMPLEMENTATION FOR FUTURE NETWORKS .....</b>	<b>298</b>
<i>Yiwen Le, Jinghan He</i>	
<b>TASKS SCHEDULING METHOD BASED ON COMPETITIVE CO-EVOLUTIONARY ALGORITHM.....</b>	<b>302</b>
<i>Haijie Yu, Sheng Su, Qingguang Guo</i>	
<b>STUDY ON THE METHOD OF COMPLEX LINES SELECTION AND AUTOMATED PROCESSING FOR RAILWAY MARSHALLING YARD.....</b>	<b>306</b>
<i>Chengming Li, Xixia You, Xiaoli Liu, Pengda Wu</i>	
<b>OPENING OPTIMIZATION AND DIAMETER MATCHING FOR BACK PRESSURE VALVE IN A HIGH PRESSURE PEMFC SYSTEM .....</b>	<b>311</b>
<i>Fengxiang Chen, Ying Liu, Yang Yu, Jilong He, Xiaoyu Chen</i>	
<b>THE INEQUALITY OF WORK DERIVED FROM CLAUSIUS INEQUALITY AND CARNOT THEOREM.....</b>	<b>315</b>
<i>Chengshu Jin</i>	
<b>DOWNHOLE PRESSURE CONTROLLED PLUNGER GAS LIFT RESEARCH AND APPLICATION IN BLOCK SU75 OF SULIGE GAS FIELD .....</b>	<b>318</b>
<i>Lina Wang, Gang Cheng, Lianchi Ye, Yongxiang Yang, Xiaofeng Xu, Jixiang Ma, Shengli Zhang, Baohong Zhao</i>	
<b>DIRECT CALCULATION AND EVALUATION OF STRUCTURE STRENGTH FOR OFFSHORE WIND POWER OPERATION AND MAINTENANCE CATAMARAN.....</b>	<b>321</b>
<i>Chao Chen, Zhi Liu</i>	
<b>COMPARATIVE ANALYSIS OF SINGLE AND THREE-PHASE DUAL ACTIVE BRIDGE BIDIRECTIONAL DC-DC CONVERTER BASED ON THE PHASE-SHIFTING CONTROL .....</b>	<b>326</b>
<i>Gangui Yan, Yonglin Li, Qi Jia</i>	
<b>INTERVAL POWER FLOW ANALYSIS BASED ON TYPE-II FUZZY LOGIC FORECASTING.....</b>	<b>334</b>
<i>Ruihua Bi, Li Tao, Dongli Xu, Xiang Wang</i>	
<b>A PRACTICAL SYSTEM AND PROCEDURE ENABLING BATTERY TRADING IN REAL-WORLD INDUSTRY.....</b>	<b>340</b>
<i>Victor K. Y. Chan, Sok Lei Leong</i>	
<b>Author Index</b>	