2013 1st International Future Energy Electronics Conference

(IFEEC 2013)

Tainan, Taiwan
3-6 November 2013
### Technical Oral Sessions

<table>
<thead>
<tr>
<th>S01</th>
<th>S02</th>
<th>S03</th>
<th>S04</th>
<th>S05</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-DC Converter I</td>
<td>AC-DC Converter II</td>
<td>Power Quality</td>
<td>Distributed Energy System I</td>
<td>Energy Storage</td>
</tr>
<tr>
<td>S06</td>
<td>S07</td>
<td>S08</td>
<td>S09</td>
<td>S10</td>
</tr>
<tr>
<td>Electric Machines and Drives</td>
<td>DC-DC Converter I</td>
<td>DC-DC Converter II</td>
<td>AC and DC Motor Drives</td>
<td>Power Electronic Devices and Components I</td>
</tr>
<tr>
<td>S11</td>
<td>S12</td>
<td>S13</td>
<td>S14</td>
<td>S15</td>
</tr>
<tr>
<td>Electric Vehicles</td>
<td>LED Driver System</td>
<td>DC-DC Converter III</td>
<td>Power Converter Applications</td>
<td>Distributed Energy System II</td>
</tr>
<tr>
<td>S16</td>
<td>S17</td>
<td>S18</td>
<td>S19</td>
<td>S20</td>
</tr>
<tr>
<td>PV System I</td>
<td>Power Electronics Applications I</td>
<td>Power Integrated Circuits</td>
<td>Multilevel Converters I</td>
<td>Multilevel Converters II</td>
</tr>
<tr>
<td>S21</td>
<td>S22</td>
<td>S23</td>
<td>S24</td>
<td>S25</td>
</tr>
<tr>
<td>PV System II</td>
<td>Wind Power System</td>
<td>Power Electronics Applications II</td>
<td>Lighting Driver System</td>
<td>Converter Topologies</td>
</tr>
<tr>
<td>S26</td>
<td>S27</td>
<td>S28</td>
<td>S29</td>
<td>S30</td>
</tr>
<tr>
<td>Sensor and Sensor-less Control for Motor Driver</td>
<td>Impact of Renewable Energy System</td>
<td>Modeling and Control I</td>
<td>Modeling and Control II</td>
<td>Power Electronic Devices and Components II</td>
</tr>
</tbody>
</table>

### Technical Poster Sessions

<table>
<thead>
<tr>
<th>P01</th>
<th>P02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Converter and Applications</td>
<td>Applications of Power Electronics</td>
</tr>
</tbody>
</table>
## Technical Oral Sessions

**S01  Converter I: AC-DC Converter I**

**Time:** Monday, Nov. 4, 2013, 13:00 – 14:50  
**Place:** An Ping (Level B2)  
**Chair(s):** Prof. Takaharu Takeshita, *Nagoya Institute of Technology*, Japan  
Prof. Huang-Jen Chiu, *National Taiwan University of Science and Technology*, Taiwan

| Time          | Paper Number | Title                                                                                                           | Authors                                                                                           | Affiliations                                      |
|---------------|--------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 13:00 – 13:22 | 1096         | A Bridgeless Active-Clamp Power Factor Correction Isolated SEPIC Converter with Mixed DCM/CCM Operation 1       | Yie-Tone Chen and Sheng-Zhi Mo                                                                    | *National Yunlin University of Science and Technology*, Taiwan                                    |
| 13:22 – 13:44 | 1159         | Isolated Quasi Z-Source Bridgeless Power Factor Correction with Coupled Inductor 7                               | Quang Trong Nha, Huang-Jen Chiu, Yu-Kang Lo, Pham Phu Hieu, and Mohammed Mahmood Alam           | *National Taiwan University of Science and Technology*, Taiwan                                    |
| 13:44 – 14:06 | 1174         | Discharge Operation of Single-Stage Buck Bi-Directional AC/DC Converter 12                                        | Yuya Fujishima, Wataru Kitagawa, and Takaharu Takeshita                                          | *Nagoya Institute of Technology*, Japan                                                           |
### S02 Converter II: AC-DC Converter II

**Time:** Monday, Nov. 4, 2013, 13:00 – 14:50  
**Place:** Fu Cheng (Level B2)  
**Chair(s):** Prof. Mutsuo Nakaoka, *Kyungnam University*, Republic of Korea  
Prof. Ching-Tsai Pan, *National Tsing Hua University*, Taiwan

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:00 – 13:22</td>
<td>1199</td>
<td>Self-Commissioning of Digital-Controlled Power Factor Corrector with Critical Current Mode</td>
<td>Yen-Shin Lai, Shang-Wei Chen, and Zih-Jie Su</td>
<td><em>National Taipei University of Technology</em>, Taiwan</td>
</tr>
<tr>
<td>13:22 – 13:44</td>
<td>1202</td>
<td>Study on an Interleaved Buck Power Factor Corrector with GaNFET and Integrated Inductor</td>
<td>Chih-Chung Huang, Yu-Chen Liu, Tian-Fu Pan, Po-Jung Tseng, Chia-Hua Chang, Yu-Kang Lo, and Huang-Jen Chiu</td>
<td><em>National Taiwan University of Science and Technology</em>, Taiwan</td>
</tr>
<tr>
<td>13:44 – 14:06</td>
<td>1239</td>
<td>Analysis and Design of a ZVS Boost/Buck-boost Dual Mode PFC Converter with Universal Input and Wide Output Voltages</td>
<td>Yuanjun Zhang, Xianmian Ge, and Xinke Wu</td>
<td><em>Zhejiang University</em>, China</td>
</tr>
<tr>
<td>14:06 – 14:28</td>
<td>1251</td>
<td>Study and Implementation of a Two-phase Interleaved Bridgeless Buck Power Factor Corrector</td>
<td>Yu-Chen Liu, Tian-Fu Pan, Po-Jung Tseng, Chih-Chung Huang, Yu-Kang Lo, and Huang-Jen Chiu</td>
<td><em>National Taiwan University of Science and Technology</em>, Taiwan</td>
</tr>
<tr>
<td>14:28 – 14:50</td>
<td>1149</td>
<td>A ZVS-PWM Interleaved Boost Rectifier</td>
<td>Chien-Ming Wang(^1), Chien-Min Lu(^1), Jyun-Che Li(^1), and Chang-Hua Lin(^2)</td>
<td>(^1)<em>National Ilan University</em>, Taiwan (^2)<em>Tatung University</em>, Taiwan</td>
</tr>
</tbody>
</table>
S03  Power Converter for Utility Interface I: Power Quality

Time:  Monday, Nov. 4, 2013, 13:00 – 14:50
Place:  East Gate (Level B1)
Chair(s):  Prof. Daolian Chen, Fuzhou University, China
          Prof. Po-Tai Cheng, National Tsing-Hua University, Taiwan

13:00 – 13:22  1008
Three-Level Hybrid Active Power Filter with
Quasi-Resonant DC-Link Technique in Three-Phase
Four-Wire System  52
Bin Zhang, Io-Keong Lok, Ning-Yi Dai, Man-Chung Wong, and
Chi-Kong Wong
University of Macau, China

13:22 – 13:44  1051
An Error Current Tracking Control Method of Three-Level
Active Power Filter  58
Zhang Chenyu, Mei Jun, and Zheng Jianyong
Southeast University, China

13:44 – 14:06  1114
Voltage Perturbations Compensator on the Base of
Three-Phase Hybrid Transformer  63
Grzegorz Benysek and Jacek Kaniewski
University of Zielona Góra, Poland

14:06 – 14:28  1192
A shunt Active Power Filter for Harmonic Isolation in a
Cloud Computing Facility  69
Jhong-Wei Huang\(^1\), Po-Tai Cheng\(^1\), Jen-Chuan Liao\(^2\), and
Wen-Yin Tsai\(^2\)
\(^1\)National Tsing Hua University, Taiwan
\(^2\)Delta Electronics Inc., Taiwan

14:28 – 14:50  1249
Closed-loop Control Modeling and Dynamic Performance
Analysis of 400Hz Active Filter  75
Zhong Chen, Zhihui Wang, Mengnan Li, and Miao Chen
Nanjing University of Aeronautics and Astronautics, China
<table>
<thead>
<tr>
<th>Time:</th>
<th>Monday, Nov. 4, 2013, 13:00 – 14:50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place:</td>
<td>West Gate (Level B1)</td>
</tr>
</tbody>
</table>
| Chair(s):   | Prof. Masafumi Miyatake, Sophia University, Japan  
Prof. Yaow-Ming Chen, National Taiwan University, Taiwan |

| 13:00 – 13:22 | 1110 The Effectiveness Evaluation of the newly Improved PSO-based MPPT Controlling Multiple PV Arrays  
Vanxay Phimmasone, Yuta Kondo, Natsuki Shiota, and Masafumi Miyatake  
Sophia University, Japan |
|---------------|----------------------------------|
| 13:22 – 13:44 | 1134 Research on Grid-connected Interleaved Inverter with L Filter  
Wenxi Yao, Zhengyu Lu, Huang Long, and Bin Li  
Zhejiang University, China |
| 13:44 – 14:06 | 1177 An Active Power Conditioner with a Multi-Mode Power Control Strategy for a Microgrid  
Y.-T. Chen¹, Y.-F. Chen¹, C.-Y. Tang¹, Y.-M. Chen¹, and Y.-R. Chang²  
¹National Taiwan University, Taiwan  
²Atomic Energy Council, Taiwan |
| 14:06 – 14:28 | 1196 Rapid Reactive Power Control Method for Parallel Inverters Using Resistive-Capacitive Output Impedance  
Yandong Chen, An Luo, Jie Zhou, Lisha Bai, and Chunming Tu  
Hunan University, China |
| 14:28 – 14:50 | 1209 Optimal Load Sharing using Droop Control and Fuzzy Control in Uninterruptible Smart House  
Masaya Miyagi¹, Shuta Morinaga¹, Yuhei Shiroma¹, and Toshihisa Funabashi²  
¹University of the Ryukyus, Japan  
²Meidensha Corporation, Japan |
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:00 – 13:22</td>
<td>Design of Active Balance Circuit for Lithium Battery Pack 1075</td>
<td>Yong-Nong Chang(^1), Yu-Siang Shen(^1), Hung-Liang Cheng(^2), and Shun-Yu Chan(^3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(^1)National Formosa University, Taiwan (^2)I-Shou University, Taiwan (^3)Cheng Shiu University, Taiwan</td>
</tr>
<tr>
<td>13:22 – 13:44</td>
<td>A Microcontroller-Based Fast Charger with State-Of-Charge Estimation for LiCoO(_2) Battery 1173</td>
<td>Chang-Hua Lin(^1), Min-Hsuan Hung(^1), Chien-Ming Wang(^2), and Chien-Yeh Ho(^3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(^1)Tatung University, Taiwan (^2)National Ilan University, Taiwan (^3)LungHwa University of Science and Technology, Taiwan</td>
</tr>
<tr>
<td>13:44 – 14:06</td>
<td>On the Flywheel/Battery Hybrid Energy Storage System for DC Microgrid 1257</td>
<td>K. W. Hu and C. M. Liaw ^ National Tsing Hua University, Taiwan</td>
</tr>
<tr>
<td>14:06 – 14:28</td>
<td>Wireless Power Transfer Based on MHz Inverter through PCB Antenna 1224</td>
<td>Natthaphon Phokhaphan(^1), Krit Choeisai(^1), Kenji Noguchi(^2), Takahiro Araki(^2), Keisuke Kusaka(^2), Koji Orikawa(^2), and Jun-ichi Itoh(^2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(^1)Khon Kaen University, Thailand (^2)Nagaoka University of Technology, Japan</td>
</tr>
</tbody>
</table>
13:00 – 13:22 1166
Performance Analysis of a Three-Phase Induction Motor with Double-Triple Winding Layout 131
Mbika Muteba¹ and Adisa A. Jimoh²
¹Vaal University of Technology, South Africa
²Tshwane University of Technology, South Africa

13:22 – 13:44 1267
48V Power Assist Recuperation System (PARS) with a Permanent Magnet Motor, Inverter and DC-DC Converter 137
Changsung Sean Kim, Kyeounghun Park, Hantae Kim, Geunhong Lee, Kwanghyun Lee, Hyun Jik Yang, Hansam Cho, Minsup Song, and Youngdong Son
SAMSUNG Electro-Mechanics Co., Ltd., Korea

13:44 – 14:06 1250
A Dead-Time Compensation method on A PWM Control Scheme for a 6 Switches Two PMSMs Drive Inverter 143
Junnosuke Haruna, Sho Ikegami, and Nobukazu Hoshi
Tokyo University of Science, Japan
### Converter III: DC-DC Converter I

**Time:** Monday, Nov. 4, 2013, 15:10 – 17:00  
**Place:** An Ping (Level B2)  
**Chair(s):** Prof. Sewan Choi, Seoul Tech, Republic of Korea  
Prof. Chien-Hung Tsai, National Cheng Kung University, Taiwan

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper Number</th>
<th>Title</th>
</tr>
</thead>
</table>
Hsi-Jui Wang\(^1\) and Le-Ren Chang-Chien\(^2\)  
\(^1\)Holtek Semiconductor, Inc., Taiwan  
\(^2\)National Cheng Kung University, Taiwan |
| 15:32 – 15:54 | 1215         | Loss Analysis of Half-Bridge LLC Resonant Converter  
Chun-Hsu Yang, Tsorng-Juu Liang, Kai-Hui Chen, Ji-Shiuan Li, and Ji-Shiang Lee  
National Cheng Kung University, Taiwan |
| 15:54 – 16:16 | 1218         | A Bidirectional Three-Phase Push-Pull Converter With Dual Asymmetrical PWM Method  
Minho Kwon, Junsung Park, and Sewan Choi  
Seoul National University of Science and Technology, Korea |
| 16:16 – 16:38 | 1242         | The Analysis and Optimization of the Transformer on Common-mode Conduction EMI in LLC Converter  
Qingbin Chen and Wei Chen  
Fuzhou University, China |
**S08 Converter IV: DC-DC Converter II**

**Time:** Monday, Nov. 4, 2013, 15:10 – 17:00

**Place:** Fu Cheng (Level B2)

**Chair(s):** Prof. Makoto Hagiwara, *Tokyo Institute of Technology*, Japan
Prof. Yie-Tone Chen, *National Yunlin University of Science & Technology*, Taiwan

---

15:10 – 15:32  **1248**

High Efficiency Isolated DC-DC Converter Combining Resonant and Phase-Shifted Topologies for Electrical Vehicle Chargers  
Wensong Yu¹, Hongmei Wan¹, Jih-Sheng Lai¹, Hidekazu Miwa², Wei-Han Lai², Nan-Hsiung Tseng³, Chi-Seng Lee³, Chin-Hone Lin³, and Ya-Wen Shih³  
¹*Virginia Polytechnic Institute and state University*, USA  
²*Enertronics, Inc.*, USA  
³*Industrial Technology Research Institute*, Taiwan

15:32 – 15:54  **1088**

Design and Implementation of Digital Power Converter for Wind Energy Conversion System  
Chih-Chiang Hua, Wei-Tze Chen, and Yi-Hsiung Fang  
*National Yunlin University of Science and Technology*, Taiwan

15:54 – 16:16  **1057**

A Transformer-less Interleaved Four-Phase Current-Fed Converter with New Voltage Multiplier Topology  
Ching-Tsai Pan, Chen-Feng Chuang, and Chia-Chi Chu  
*National TsingHua University*, Taiwan

16:16 – 16:38  **1082**

Research of Efficient DC-DC Converter Based on SiC Power Devices and ZVS Soft Switches  
Xiaodan Xi, Shaokai Liu, and Jiexin Kuang  
*Zhejiang University*, China

16:38 – 17:00  **1087**

Zero Voltage Switching High Step-Up DC-DC Converter with Coupled-inductor  
Sheng-Kai Kao, Jiann-Fuh Chen, and Yi-Ping Hsieh  
*National Cheng Kung University*, Taiwan
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:10 – 15:32</td>
<td>1100</td>
<td>Implementation of Position and Force Controllers for a Micro-Hand Based on Adaptive Inverse Control</td>
<td>Wan-Cheng Wang, Tian-Hua Liu, Yuddy Syaifudin, and Tsan-Kai Wang</td>
<td>National Taiwan University of Science and Technology, Taiwan</td>
</tr>
<tr>
<td>15:32 – 15:54</td>
<td>1103</td>
<td>Fast Starting Method using both Inverter and Delta-Star Starter for Weaving Machine Drive Systems</td>
<td>Masakazu Kato, Koji Orikawa, Jun-ichi Itoh, and Noboru Saitoh</td>
<td>Nagaoka University of Technology, Japan; HOKUETSU DENKEN Co., Ltd, Japan</td>
</tr>
<tr>
<td>15:54 – 16:16</td>
<td>1182</td>
<td>An Improved Model-Free Predictive Current Control for Four-Switch Three-Phase Inverter-Fed Synchronous Reluctance Motor Drives</td>
<td>Fu-Wen Chan, Chih-I Peng, Cheng-Kai Lin, and Hsing-Cheng Yu</td>
<td>National Taiwan Ocean University, Taiwan</td>
</tr>
<tr>
<td>16:16 – 16:38</td>
<td>1232</td>
<td>High Efficiency SRM drive using a Current Source Inverter</td>
<td>Tomohiro Takahashi, Takanori Nagai, and Kan Akatsu</td>
<td>Shibaura Institute of Technology, Japan</td>
</tr>
</tbody>
</table>
Time: Monday, Nov. 4, 2013, 15:10 – 17:00
Place: West Gate (Level B1)
Chair(s): Prof. Keiji Wada, Tokyo Metropolitan University, Japan

15:10 – 15:32 1263
T-type 3-level IGBT Power Module Using Authentic Reverse Block-ing IGBT (RB-IGBT) for Renewable Energy Applications 229
Shuangching Chen, David H Lu, Hiroki Wakimoto, Haruo Nakazawa, and Masahito Otsuki
Fuji Electric Co. Ltd., Japan

15:32 – 15:54 1044
A Study of Coil Structure of Inductive Power Collection System for Moving Vehicle 235
Daisuke Shimode, Toshiaki Murai, and Shunsuke Fujiwara
Central Japan Railway Company, Japan

15:54 – 16:16 1121
Discussion on Design Optimization of Inductor Loss Focused on Copper Loss and Iron Loss 241
Kazuto Emori, Toshihisa Shimizu, and Yoshio Bizen
Tokyo Metropolitan University, Japan

16:16 – 16:38 1143
An Inductive Power Transfer through Metal Object 246
OdunAyo Imoru1, Anoop Jassal2, Henk Polinder2, Evert Nieuwkoop3, Jacob Tsado4, and Adisa A. Jimoh1
1Tshwane University of Technology, South Africa
2Delft University of Technology, Netherlands
3The Netherlands Organization for Applied Scientific Research, Netherlands
4Federal University of Technology, Nigeria

16:38 – 17:00 1005
Digital Implementation of GaN-Based Inverter for Permanent Magnet Electrodynamic Shaker 252
Hung-Chi Chen and Jhen-Yu Liao
National Chiao Tung University, Taiwan
### S11  Power Electronics Applications II: Electric Vehicles

**Time:**  
Monday, Nov. 4, 2013, 15:10 – 17:00  

**Place:**  
South Gate (Level B1)  

**Chair(s):**  
Prof. Hideaki Fujita, *Tokyo Tech*, Japan  
Prof. Zhengyu Lu, *Zhejiang University*, China  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 15:10 – 15:32 | 1055      | **Review of Current Quality Compensators for High Power Unidirectional Electric Vehicle Battery Charger**  | Chi-Seng Lam¹, Chi-Yung Chung¹,², and Man-Chung Wong¹  
°¹*University of Macau*, China  
°²*The Hong Kong Polytechnic University*, China |
| 15:32 – 15:54 | 1109      | **Proposal of Negawatt Cost and the extension to Kilometrage Cost**  | Kanade Endo and Atsuo Kawamura  
°*Yokohama National University*, Japan |
| 15:54 – 16:16 | 1111      | **Implementation of a Bidirectional Three-Phase Dual-Active-Bridge DC Converter for Electric Vehicle Applications**  | Fu-Ming Ni and Tzung-Lin Lee  
°*National Sun Yat-sen University*, Taiwan |
| 16:16 – 16:38 | 1129      | **Monitoring And Analysis of Power Quality in Electric Vehicle Charging Stations**  | Qiushuo Li, Shun Tao, Xiangning Xiao, and Jianfeng Wen  
°*North China Electric Power University*, China |
| 16:38 – 17:00 | 1132      | **An Integrated Derived Boost-Flyback Converter for Fuel Cell Hybrid Electric Vehicles**  | Kuo-Ching Tseng¹, Jian-Ting Lin¹, and Chun-An Cheng²  
°¹*National Kaohsiung First University of Science and Technology*, Taiwan  
°²*I-Shou University*, Taiwan |
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presentation Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:10 – 15:32</td>
<td>1003</td>
<td>A Novel Power Feeding Circuit for LED Buck Driver</td>
<td>Tse-Ju Liao and Chern-Lin Chen</td>
<td>National Taiwan University, Taiwan</td>
</tr>
<tr>
<td>15:32 – 15:54</td>
<td>1054</td>
<td>A Primary Side Controlled Single-Stage Flyback LED Driver with High Power Factor and High Accuracy</td>
<td>Yahui Leng, Yulin Wang, Junmin Jiang, and Lenian He</td>
<td>Zhejiang University, China</td>
</tr>
<tr>
<td>15:54 – 16:16</td>
<td>1178</td>
<td>A Nanosecond Current Pulse Driver for Light Emitting Diode</td>
<td>Tse-Ju Liao, Yu-Chen Liu, and Chern-Lin Chen</td>
<td>National Taiwan University, Taiwan</td>
</tr>
<tr>
<td>16:16 – 16:38</td>
<td>1190</td>
<td>Bridgeless Electrolytic Capacitor-less Valley Fill AC/DC Converter for Twin-Bus Type LED Lighting Applications</td>
<td>Hongbo Ma¹, Cong Zheng², Wensong Yu², and Jih-Sheng (Jason) Lai²</td>
<td>¹Southwest Jiaotong University, China ²Virginia Polytechnic and State University, USA</td>
</tr>
<tr>
<td>16:38 – 17:00</td>
<td>1200</td>
<td>High-efficiency Quasi-two-stage Converter with Current Sharing for Multi-channel LED Driver</td>
<td>Ting Jiang, Junming Zhang, Kuang Sheng, and Zhaoming Qian</td>
<td>Zhejiang University, China</td>
</tr>
</tbody>
</table>
## S13 Converter V: DC-DC Converter III

**Time:** Tuesday, Nov. 5, 2013, 13:20 – 15:10  
**Place:** An Ping (Level B2)  
**Chair(s):** Prof. Jason Lai, *Virginia Polytechnic Institute and State University*, USA  
Prof. Yuang-Shung Lee, *Fu Jen Catholic University*, Taiwan

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:42 – 14:04</td>
<td>1122</td>
<td>Multiphase High Gain Boost Converter with Switched-Capacitor and Coupled-Inductor</td>
<td>Yuang-Shung Lee, Wei-Ting Hong, and Tzu-Han Chou</td>
<td><em>Fu Jen Catholic University</em>, Taiwan</td>
</tr>
</tbody>
</table>
**S14 Converter VI: Power Converter Applications**

*Time:* Tuesday, Nov. 5, 2013, 13:20 – 15:10  
*Place:* Fu Cheng (Level B2)  
*Chair(s):* Prof. Jinjun Liu, *Xi'an Jiaotong university*, China  
Prof. Chien-Ming Wang, *National Ilan University*, Taiwan

---

13:20 – 13:42  
**1072**  
*Analysis of Class E<sub>M</sub> Amplifier With Considering Non-Zero Current Fall Time of Drain Current*  
Zhicai Zhang<sup>1</sup>, Tomoharu Nagashima<sup>1</sup>, Xiujin Wei<sup>2</sup>, Tadashi Suetsugu<sup>2</sup>, Hiroo Sekiya<sup>1</sup>, and Naoki Oyama<sup>2</sup>  
<sup>1</sup>*Chiba University*, Japan  
<sup>2</sup>*Fukuoka University*, Japan

13:42 – 14:04  
**1256**  
*A ZCS-PWM Interleaved Forward Converter*  
Chien-Ming Wang<sup>1</sup>, Chien-Min Lu<sup>1</sup>, Jyun-Che Li<sup>1</sup>, Chang-Hua Lin<sup>2</sup>, and Chien-Yeh Ho<sup>3</sup>  
<sup>1</sup>*National Ilan University*, Taiwan  
<sup>2</sup>*Tatung University*, Taiwan  
<sup>3</sup>*Lunghwa University of Science and Technology*, Taiwan

14:04 – 14:26  
**1012**  
*A Novel Simple Voltage Regulation Method for Uninterruptible Power Supply without Transformer and Voltage Divide Capacitor*  
Atsushi Hirota<sup>1</sup>, Bin Guo<sup>2</sup>, Saad Mekhilef<sup>3</sup>, and Mutsuo Nakaoka<sup>3,4</sup>  
<sup>1</sup>*Akashi National College of Technology*, Japan  
<sup>2</sup>*Panasonic*, Japan  
<sup>3</sup>*University of Malaya*, Malaysia  
<sup>4</sup>*Kyungnam University*, Korea-South

14:26 – 14:48  
**1053**  
*An Improved Switched-inductor Quasi-Z-source Inverter*  
Deng Kai<sup>1</sup>, Mei Jun<sup>1</sup>, Zheng Jianyong<sup>1</sup>, He Wei<sup>2</sup>, and Bao Huping<sup>2</sup>  
<sup>1</sup>*Southeast University*, China  
<sup>2</sup>*Jiangsu Fangcheng Electric Science and Technology Co., Ltd*, China

14:48 – 15:10  
**1085**  
*Design of a Single-Switch DC-DC Converter for PV-Battery Powered Pump System*  
Le An and Dylan Dah-Chuan Lu  
*The University of Sydney*, Australia
<table>
<thead>
<tr>
<th>Time:</th>
<th>Tuesday, Nov. 5, 2013, 13:20 – 15:10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place:</td>
<td>East Gate (Level B1)</td>
</tr>
<tr>
<td>Chair(s):</td>
<td>Prof. Hirofumi Akagi, Tokyo Institute of Technology, Japan</td>
</tr>
<tr>
<td></td>
<td>Prof. Chia-Chi Chu, National Tsing Hua University, Taiwan</td>
</tr>
</tbody>
</table>

|               |      | Lin-Yu Lu and Chia-Chi Chu | National Tsing Hua University, Taiwan |

| 13:42 – 14:04 | 1229 | Coordinate Control System for Photovoltaic-based DC Microgrid | 371 |
|               |      | Ying Huang, Yu Peng, Meng Huang, Jianjun Sun, and Xiaoming Zha | Wuhan University, China |

| 14:04 – 14:26 | 1024 | Unidirectional Buck DC-DC converter mode photovoltaic grid-connected inverters with high frequency link | 376 |
|               |      | Jie Zhang, Fusong Huang, Bin Yan, and Daolian Chen | Fuzhou University, China |

| 14:26 – 14:48 | 1047 | Quadratic High Gain Boost Converter for Grid-Tie PV System Application | 382 |
|               |      | Yuang-Shung Lee, Tzu-Han Chou, Ling-Chia Yu, and Hsin-Wei Huang | Fu Jen Catholic University, Taiwan |
13:20 – 13:42 1056
A Novel High Step-Up DC-DC Converter with Zero DC Bias Current Coupled-Inductor for Microgrid System 388
Chia-Hua Yeh, Yi-Ping Hsieh, and Jiann-Fuh Chen
National Cheng Kung University, Taiwan

13:42 – 14:04 1112
A Discontinuous PWM for Three Level Converters with Constant Common-Mode Voltage 395
Chung-Chuan Hou
Chung Hua University, Taiwan

14:04 – 14:26 1169
A Novel Low Voltage Ride Through Strategy of Two-Stage Grid-Connected Photovoltaic Inverter 400
Shuzheng Wang, Xiaojun Yao, and Jianfeng Zhao
Southeast University, China

14:26 – 14:48 1175
A hybrid PWM modulation scheme for PV inverter 406
Cheng Yan, Chao Sun, Yangfan Zhang, Min Chen, Dehong Xu
Zhejiang University, China

14:48 – 15:10 1180
DSP-Based Simple and Efficient Synchronizer for Three-Phase Grid-Connected Renewable Energy Systems 411
Gamal M. Dousoky¹ and Masahito Shoyama²
¹Minia University, Egypt
²Kyushu University, Japan
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:20 – 13:42</td>
<td>Design of Static Self Shunt Excitation System for Giant Hydro Generator</td>
<td>Qipin Xu, Yixiang Shao, Qiantao Huo, and Shaoxing Zhao</td>
<td>State Grid Electric Power Research Institute, China</td>
</tr>
<tr>
<td>14:04 – 14:26</td>
<td>A New Close-loop Based Capacitor Voltage Control Method for Modular Multilevel Converter with the Switching Frequency of 150 Hz</td>
<td>Sixing Du, Jinjun Liu, and Teng Liu</td>
<td>Xi'an Jiaotong University, China</td>
</tr>
<tr>
<td>14:26 – 14:48</td>
<td>Three-loop Digital Control Strategy Combining PI and Quasi-PR Controller for High Tracking Precision Power Supply Used in ZnO Characteristics Testing</td>
<td>Lang Huang, Xiang Hao, Xu Yang, Ting Liu, Ruiliang Xie, and Tao Liu</td>
<td>Xi'an Jiaotong University, China</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14:04 – 14:26</td>
<td>1125</td>
<td>Microcontroller Power Integrity Black-Box Model</td>
<td>Shih-Yi Yuan¹ and Cheng-Chang Chen²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:26 – 14:48</td>
<td>1162</td>
<td>IC Design of Primary-Side Control for Flyback Converter</td>
<td>Ying-Ting Lin, Tsorng-Juu Liang, and Kai-Hui Chen</td>
</tr>
</tbody>
</table>
S19  Converter VII: Multilevel Converters I

**Time:** Tuesday, Nov. 5, 2013, 15:30 – 17:20  
**Place:** An Ping (Level B2)  
**Chair(s):** Prof. Toshihisa Shimizu, *Tokyo Metropolitan University*, Japan  
Prof. Chun-An Cheng, *I-Shou University*, Taiwan

15:30 – 15:52  
**1066** Experimental Verification of a Modular Multilevel Cascade Converter Based on Triple-Star Bridge-Cells (MMCC-TSBC) for Motor Drives  
Wataru Kawamura, Makoto Hagiwara, and Hirofumi Akagi  
*Tokyo Institute of Technology*, Japan

15:52 – 16:14  
**1071** Detailed Design, Integration and Testing of Submodule for 1000V/85kVA Modular Multilevel Converter  
Yunfei Xu, Xiangning Xiao, Yonghai Xu, Yunbo Long, and Chang Yuan  
*North China Electric Power University*, China

16:14 – 16:36  
**1091** Isolated Dual Boost Bridgeless Power Factor Correction AC-DC Converter  
Mohammed Mahmood, Huang-Jen Chiu, Yu-Kang Lo, Quang Trong Nha, Pham Phu Hieu, and Irwan Purnama  
*National Taiwan University of Science and Technology*, Taiwan

16:36 – 16:58  
**1092** A Speed-Sensorless Startup of an Induction Motor Driven by a Modular Multilevel Cascade Inverter (MMCI-DSCC) – Applications to Quadratic-Torque Loads Like Fans, Blowers, and Compressors  
Yuhei Okazaki, Makoto Hagiwara, and Hirofumi Akagi  
*Tokyo Institute of Technology*, Japan

16:58 – 17:20  
**1133** A Single-Phase to Three-Phase Direct AC/AC Modular Multilevel Cascade Converter Based on Double-Star Bridge-Cells (MMCC-DSBC)  
Nuntawat Thitichaiworakorn, Makoto Hagiwara, and Hirofumi Akagi  
*Tokyo Institute of Technology*, Japan
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper Title</th>
<th>Authors</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:30 – 15:52</td>
<td>Harmonic Reduction Technique with a Five-level Inverter for Four Pole Induction Motor Drive</td>
<td>Kiran Kumar Nallamekala, Meher Kalyan U, and Sivakumar K</td>
<td>Indian Institute of Technology Hyderabad, India</td>
</tr>
<tr>
<td>15:52 – 16:14</td>
<td>A Front-to-Front (FTF) System Consisting of Two Modular Multilevel Cascade Converters Based on Double-Star Chopper-Cells</td>
<td>Firman Sasongko, Makoto Hagiwara, and Hirofumi Akagi</td>
<td>Tokyo Institute of Technology, Japan</td>
</tr>
<tr>
<td>16:14 – 16:36</td>
<td>A Novel Partial Units Energy Feedback Cascaded Multilevel Inverter with Bypass Control</td>
<td>Juntao Yao, Fei Liu, Jinwu Gong, and Shangsheng Li</td>
<td>Wuhan University, China</td>
</tr>
<tr>
<td>16:36 – 16:58</td>
<td>A Hybrid Communication Method for Unit Control Of Cascade Multilevel Converters</td>
<td>Zhao Shengkai, Tan Shulong, Li Xiaojun, Geng Hua, and Yang Geng</td>
<td>Tsinghua University, China</td>
</tr>
</tbody>
</table>
### Power Converter for Utility Interface V: PV System II

**Time:** Tuesday, Nov. 5, 2013, 15:30 – 17:20  
**Place:** East Gate (Level B1)  
**Chair(s):** Prof. Ching-Shan Leu, National Taiwan University of Science and Technology, Taiwan

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper Reference</th>
<th>Title</th>
<th>Authors</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:30 – 15:52</td>
<td>1181</td>
<td>A DSP-based Grid-tied Solar Cascode-micro-inverter</td>
<td>Tai-Hung Wang, Yu-Chen Liu, Shih-Jen Cheng, Yu-Kang Lo, and Huang-Jen Chiu</td>
<td>National Taiwan University of Science and Technology, Taiwan</td>
</tr>
</tbody>
</table>
| 15:52 – 16:14 | 1185            | The Current Control of PV Inverter for Three-Phase Unbalanced Fault with Lagrange Multiplier | W.-T. Kuo\(^1\), Y.-C. Hsu\(^1\), C. W. Liu\(^1\), Y.-M. Chen\(^1\), Y.-R. Chang\(^2\), and H.-L. Huang\(^2\) | \(^1\)National Taiwan University, Taiwan  
\(^2\)Institute of Nuclear Energy Research, Taiwan |
| 16:14 – 16:36 | 1187            | LLC Converter with Taiwan Tech Center-Tapped Rectifier (LLC-TCT) for Solar Power Conversion Applications | Ching-Shan Leu, Pin-Yu Huang, and Wei-Kai Wang | National Taiwan University of Science and Technology, Taiwan |
| 16:36 – 16:58 | 1214            | High Efficiency two-stage Cascaded Converter with Energy Storage Device for Renewable Energy Sources | Hwa-Seok Lee, Chan-In Kim, Sun-Jae Park, and Joung Hu Park | Soongsil University, South Korea |
| 16:58 – 17:20 | 1253            | A Dual-Buck Based Equalizer Operating in Burst-mode for Split Phase Inverter | Lanhua Zhang\(^1\), Jason Dominic\(^1\), Bin Gu\(^1\), Jih-Sheng Lai\(^1\), and Chien-liang Chen\(^2\) | \(^1\)Virginia Polytechnic Institute and State University, USA  
\(^2\)International Rectifier, USA |
Power Converter for Utility Interface VI: Wind Power System

Time: Tuesday, Nov. 5, 2013, 15:30 – 17:20
Place: West Gate (Level B1)
Chair(s): Prof. Katsumi Nishida, *Ube National College of Technology*, Japan
Prof. Li Wang, *National Cheng Kung University*, Taiwan

15:30 – 15:52

1098
**Cost-effective High-reliability Power-Conditioning System used for Grid Integration of Variable-speed Wind Turbine**
Katsumi Nishida¹, Tarek Ahmed², Saad Mekhilef³, and Mutsuo Nakaoka⁴
¹*Ube National College of Technology*, Japan
²*JUST University*, Jordan
³*University of Malaya*, Malaysia
⁴*Kyungnam University*, South Korea

15:52 – 16:14

1254
**Control of DFIG with New Space-Vector based Hysteresis Current Regulator Title**
DanVu Nguyen and Goro Fujita
*Shibaura Institute of Technology*, Japan

16:14 – 16:36

1009
**Damping Improvement of a DFIG-based Wind Turbine Generator Connected to an Infinite Bus Using a Fuzzy Logic Controller**
Li Wang and Nguyen Thi Ha
*National Cheng Kung University*, Taiwan

16:36 – 16:58

1011
**Analysis of Voltage Variations of Taiwan Power System Connected with a Large-Scale Offshore Wind Farm**
Li Wang, Min-Han Hsieh, Cheng-Tai Wu, and Chieh-Lung Lu
*National Cheng Kung University*, Taiwan
Time: Tuesday, Nov. 5, 2013, 15:30 – 17:20
Place: South Gate (Level B1)
Chair(s): Prof. Jun-ichi Itoh, Nagaoka University of Technology, Japan
Prof. Chih-Chiang Hua, National Yunlin University of Science and Technology, Taiwan

15:30 – 15:52 1050
Analysis and Mitigation Countermeasures of a New SSO Phenomenon 553
Chao Luo, Xiangning Xiao, Jingjing Lu, Jian Zhang, and Chang Yuan
North China Electric Power University, China

15:52 – 16:14 1150
Techniques for Reduction of Common-Mode EMI Based on the Concepts of Current Balance on the Power Transformer Windings 558
Hung-I Hsieh and Sheng-Fang Shih
National Chiayi University, Taiwan

16:14 – 16:36 1077
Design Optimization and Analysis of AFPM Synchronous Motor Considering Electrical and Thermal Parameters 562
Amin Mahmoudi\textsuperscript{1}, Solmaz Kahourzade\textsuperscript{1}, Hew Wooi Ping\textsuperscript{1}, and Ali Gandomkar\textsuperscript{2}
\textsuperscript{1}University of Malaya, Malaysia
\textsuperscript{2}Yeungnam University, Korea

16:36 – 16:58 1131
An Investigation into Series Power Tapping Options of HVDC Transmission Lines 568
André Hartshorne\textsuperscript{1}, Hendrik du Toit Mouton\textsuperscript{1}, and Udaya K. Madawala\textsuperscript{2}
\textsuperscript{1}University of Stellenbosch, South Africa
\textsuperscript{2}University of Auckland, New Zealand

16:58 – 17:20 1201
Design of the effective Linear Generator using Mechanical Vibration Energy 874
Daisuke Yamamoto, Kazuya Hirasawa, and Shunsuke Ohashi
Kansai University, Japan
**S24 Lighting Technologies and Applications II: Lighting Driver System**

*Time:* Tuesday, Nov. 5, 2013, 15:30 – 17:20  
*Place:* North Gate (Level B1)  
*Chair(s):* Prof. Junming Zhang, Zhejiang University, China  
Prof. Hongbo Ma, Southwest Jiaotong University, China

15:30 – 15:52  **1138**  
**Single-Stage High-Power-Factor LED Driver with ZVS and Current-Sharing Features**  
Chien-Hsuan Chang, En-Chih Chang, Hung-Liang Cheng, and Fang-Ying Liu  
*I-Shou University*, Taiwan

15:52 – 16:14  **1208**  
**Stability Analysis of a Constant Off-time Peak-Current Mode LED Driver**  
Yan-Mou Chen¹, Dan Chen¹, Chung-Ping Ku¹, and Chun-Hung Lin²  
¹*National Taiwan University*, Taiwan  
²*Alpha & Omega Semiconductor*, Taiwan

16:14 – 16:36  **1211**  
**Design and Implementation of Retrofit LED Lamp for Fluorescent Lamp Driven by Electronic, Electromagnetic Ballast and AC Mains**  
Tsorng-Juu Liang, Wei-Jing Tseng, Wan-Rong Chen, and Jiann-Fuh Chen  
*National Cheng Kung University*, Taiwan

16:36 – 16:58  **1172**  
**A Novel Impulsed-Power for Field Emission Lighting with Phase-Locked Loop Feedback Mechanism**  
Chang-Hua Lin¹, Min-Hsuan Hung¹, Chien-Ming Wang², and Liang-Cheng Lee³  
¹*Tatung University*, Taiwan  
²*National Ilan University*, Taiwan  
³*St. John’s University of S. & T.*, Taiwan

16:58 – 17:20  **1240**  
**Development of Lamp-Power-Dependent Models for High-Intensity-Discharge Lamps**  
Chun-An Cheng¹, Hung-Liang Cheng¹, Tsung-Yuan Chung¹, and Kuo-Ching Tseng²  
¹*I-Shou University*, Taiwan  
²*National Kaohsiung First University of Science and Technology*, Taiwan
**S25 Converter IX: Converter Topologies**

**Time:** Wednesday, Nov. 6, 2013, 08:30 – 10:20  
**Place:** East Gate (Level B1)  
**Chair(s):** Prof. Tsai-Fu Wu, **National Tsing Hua University**, Taiwan

**08:30 – 08:52**  
1123 An Inductor-Less Three-Phase to Single-Phase Boost Converter for Multi-Pole Permanent Magnet Synchronous Generators  
Hideaki Fujita  
*Tokyo Institute of Technology*, Japan

**08:52 – 09:14**  
1124 A Single-stage High Power Factor Bridgeless Forward Converter with an Improved Constant On-time Control  
Zhou Lan, Xiaogao Xie, Hanjing Dong, and Shirong Liu  
*Hangzhou Dianzi University*, China

**09:14 – 09:36**  
1144 The Origin of Converters  
Tsai-Fu Wu  
*National Tsing Hua University*, Taiwan

**09:36 – 09:58**  
1151 LLC Converter with Taiwan Tech Voltage Doubler Rectifier (LLC-TVD) for Large-Size LED-Backlit LCD Display Applications  
Pin-Yu Huang, Ching-Shan Leu, Wei-Chun Lin, and Keng-Hung Liao  
*National Taiwan University of Science and Technology*, Taiwan

**09:58 – 10:20**  
1236 Dynamic Control and Analysis of Dc-Capacitor Voltage Fluctuations in Three-phase Active Power Filters  
Tomoyuki Mannen¹, Hideaki Fujita¹, Kunihiro Akiyama², Yasuo Nakashima², and Teruhisa Toyota²  
¹*Tokyo Institute of Technology*, Japan  
²*Shizuki Electric*, Japan
Motor Drives II: Sensor and Sensor-less Control for Motor Driver

**Time:** Wednesday, Nov. 6, 2013, 08:30 – 10:20

**Place:** West Gate (Level B1)

**Chair(s):** Prof. Faa-Jeng Lin, National Central University, Taiwan

---

08:30 – 08:52  **1015**  
Predictive Torque and Flux Control of a Four-Switch Inverter-Fed IM Drive  
Md. Habibullah and Dylan Dah-Chuan Lu  
*The University of Sydney, Australia*

08:52 – 09:14  **1045**  
Intelligent Fault Tolerant Control of Six-Phase Motor Drive System  
Ying-Chih Hung\(^1\) and Faa-Jeng Lin\(^2\)  
\(^1\)TECO Electric & Machinery Co., Ltd., Taiwan  
\(^2\)National Central University, Taiwan

09:14 – 09:36  **1089**  
Design and Implementation of a Regenerative Braking System for Electric Bicycles with a DSP Controller  
Chih-Chiang Hua, Shih-Jyun Kao, and Yi-Hsiung Fang  
*National Yunlin University of Science & Technology, Taiwan*

09:36 – 09:58  **1126**  
An Inductance Estimation Method for Sensorless IPMSM Drives Based on Multiphase SVPWM  
Minglei Gu, Satoshi Ogasawara, and Masatsugu Takemoto  
*Hokkaido University, Japan*

09:58 – 10:20  **1128**  
Novel PWM Scheme with Multiphase SVPWM for Reducing Current Ripple  
Minglei Gu, Satoshi Ogasawara, and Masatsugu Takemoto  
*Hokkaido University, Japan*

**Time:**  Wednesday, Nov. 6, 2013, 08:30 – 10:20  
**Place:**  South Gate (Level B1)  
**Chair(s):**  Prof. Senju Tomonobu, University of the Ryukyus, Japan

08:30 – 08:52  1167  
**Digital Control for a Three-Phase Transformerless Bi-directional Photovoltaic Inverter with Wide Inductance Variation**  
T.-F. Wu¹ and Hui-Chung Hsieh²  
¹National Tsing Hua University, Taiwan  
²National Chung Cheng University, Taiwan

08:52 – 09:14  1238  
**Optimal Scheduling Method of Distributed Generators and Plug-in Electric Vehicle for Reconfigurable Distribution Systems**  
Shun Taira¹, Zakaria Ziadi¹, and Toshihisa Funabashi²  
¹University of the Ryukyus, Japan  
²Meidensha Corporation, Japan

09:14 – 09:36  1245  
**Analysis of Modular Multilevel Converters under Unbalanced Grid Conditions with different Load Current Control Strategies and Lagrange-based Differential Current Control**  
Gilbert Bergna¹,²,³, Jon Are Suul³,⁴, Erik Berne², Philippe Egrot², Jean-Claude Vannier¹, and Marta Molinas³  
¹École Supérieure d’Électricité, France  
²Électricité de France, France  
³Norwegian University of Science of Technology, Norway  
⁴SINTEF Energy, Norway

09:36 – 09:58  1246  
**Assessment of Impact of Distributed Generators, Plug-in Electric Vehicle and Battery Energy Storage System on Power Distribution Losses**  
Shun Taira¹, Zakaria Ziadi¹, and Toshihisa Funabashi²  
¹University of the Ryukyus, Japan  
²Meidensha Corporation, Japan

09:58 – 10:20  1222  
**Optimal Scheduling Method of Controllable Loads in DC-Smart House with Deregulated Electricity Market**  
Akihiro Yoza¹ and Toshihisa Funabashi²  
¹University of the Ryukyus, Japan  
²Meidensha Corporation, Japan
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 – 10:52</td>
<td>Modeling and Simulation of Micro-grid including Inverter-interfaced Distributed Resources Based on Dynamic Phasors</td>
<td>Wei Hu¹, Jianjun Sun¹, Minghai Gao¹, Xiaoming Zha¹, Fei Liu¹, Chang Lin², and Weiwei Ma²</td>
<td>¹Wuhan University, China ²State Grid Smart Grid Research Institute, China</td>
</tr>
<tr>
<td>10:52 – 11:14</td>
<td>LLC Resonant Converter Operated at Constant Switching Frequency and Controlled by Means of a Switched-Capacitor Circuit</td>
<td>Yafei Hu¹, Amara Amara², and Adrian Ioinovici³ ¹Sun Yat-sen University, China ²Institut Supérieur d'Electronique de Paris, France ³Holon Institute of Technology, Israel</td>
<td></td>
</tr>
<tr>
<td>11:14 – 11:36</td>
<td>Modeling and Design of Cable Compensation for a Primary Side Regulation (PSR) Flyback Converter</td>
<td>Chun-Shih Huang and Shinn-Shyong Wang  Richtek Technology Corporation, Taiwan</td>
<td></td>
</tr>
<tr>
<td>11:36 – 11:58</td>
<td>Quasi-periodicity of a Buck-Boost Converter with the Nonlinearity of the Diode and the MOSFET</td>
<td>Chun-Hsien Wu and Ming-Yang Cheng  National Cheng Kung University, Taiwan</td>
<td></td>
</tr>
</tbody>
</table>
S29  Converter XI: Modeling and Control II

Time: Wednesday, Nov. 6, 2013, 10:30 – 12:20
Place: West Gate (Level B1)
Chair(s): Prof. Dylan Dah-Chuan Lu, The University of Sydney, Australia

10:30 – 10:52  1184
A Fixed-Frequency Quasi Sliding-Mode Repetitive Control (QSMRC) for Voltage Source Inverters  711
Qinwei Liu, Yuxi Wang, Wei Liu, and Hao Ma
Zhejiang University, China

10:52 – 11:14  1191
An Adaptive Sampling Method for a Highly Reliable Digital Control Power Converter  716
Aromhack Saysanasongkham¹, Masayuki Arai², Satoshi Fukumoto¹, Shun Takeuchi¹, and Keiji Wada¹
¹Tokyo Metropolitan University, Japan ²Nihon University, Japan

11:14 – 11:36  1206
Physical Modeling and Simulation of Inrush Current in Power Transformers of More Electric Aircraft  722
Y. Ji and M. R. Kuhn
German Aerospace Center, Germany

11:36 – 11:58  1244
Digital Control of PWM Inverter using Ultra High Speed Network for Feedback Signals based on Rocket I/O Protocol  728
Yasuhiro Ueda and Tomoki Yokoyama
Tokyo Denki University, Japan

11:58 – 12:20  1258
Model and Control of Diode-assisted Buck-boost Voltage Source Inverter  734
Yan Zhang, Jinhun Liu, Xiaolong Ma, and Junjie Feng
Xi'an Jiao Tong University, China
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 – 10:52</td>
<td>1073</td>
<td>Influences of Source Pick-up and Well Engineering on the ESD Robustness of LV Process nMOSTs</td>
<td>Shen-Li Chen, Min-Hua Lee, Yi-Sheng Lai, and Chun-Ju Lin</td>
<td>National United University, Taiwan</td>
</tr>
<tr>
<td>10:52 – 11:14</td>
<td>1074</td>
<td>Layout-type Dependence on ESD/LU Reliabilities for LVTnSCR Devices</td>
<td>Shen-Li Chen, Chun-Ju Lin, Min-Hua Lee, and Yi-Sheng Lai</td>
<td>National United University, Taiwan</td>
</tr>
<tr>
<td>11:14 – 11:36</td>
<td>1041</td>
<td>Resonance Analysis for DC-Side Laminated Bus-Bar of a High Speed Switching Circuit</td>
<td>Akihiro Hino and Keiji Wada</td>
<td>Tokyo Metropolitan University, Japan</td>
</tr>
<tr>
<td>11:58 – 12:20</td>
<td>1226</td>
<td>A Real Time $V_{ce}$ Measurement Issues for High Power IGBT Module in Converter Operation</td>
<td>Pramod Ghimire$^1$, Angel Ruiz de Vega$^1$, Stig Munk-Nielsen$^1$, Bjørn Rannestad$^2$, and Paul Bach Thøgersen$^2$</td>
<td>$^1$Aalborg University, Denmark $^2$kk-electronic a/s, Denmark</td>
</tr>
<tr>
<td>Session</td>
<td>Title</td>
<td>Authors</td>
<td>Affiliation</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>---------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>P01</td>
<td>Power Converter and Applications</td>
<td>Monday, Nov. 4, 2013, 17:10 – 18:10</td>
<td>Far Eastern Grand Ballroom (Level B2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chair(s): Dr. Changsung Sean KIM, SAMSUNG ELECTRO-MECHANICS CO., LTD., Republic of Korea</td>
<td>Prof. Huang-Jen Chiu, National Taiwan University of Science and Technology, Taiwan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1018</td>
<td>Design of a Fast-Transient Current-Mode Buck DC–DC Converter</td>
<td>Chia-Chieh Wong, Hung-Hsien Wu, Ming-Hsien Shih, and Chia-Ling Wei</td>
<td>National Cheng Kung University, Taiwan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1234</td>
<td>Design of a digitally-controlled LLC resonant converter with synchronous rectification</td>
<td>Yu-Shan Cheng¹, Jing-Hsiao Chen¹, Yi-Hua Liu¹, Kuo-Liang Huang¹, and Zong-Zhen Yang²</td>
<td>¹National Taiwan University of Science and Technology, Taiwan ²Industrial Technology Research Institute, Taiwan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1090</td>
<td>A Novel High Step-Up DC-DC Converter with Coupled-inductor</td>
<td>Tsai-Jie Lin, Jiann-Fuh Chen, and Yi-Ping Hsieh</td>
<td>National Cheng Kung University, Taiwan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1135</td>
<td>The Harmonic Elimination Strategy for a 24-Pulse Converter with Unequal-Impedance Phase-Shift Transformers</td>
<td>Der-Chun Shih¹, Ling-Chung Hung², and Chung-Ming Young¹</td>
<td>¹National Taiwan University of Science and Technology, Taiwan ²Lite-On Technology, Corp., Taiwan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1084</td>
<td>A Hybrid Modulation Method for Improved Modular Multilevel Converter applied for Power Quality Compensation in Medium Voltage</td>
<td>Yunbo Long, Xiangning Xiao, Yonghai Xu, Yunfei Xu, and Baolai Yu</td>
<td>North China Electric Power University, China</td>
</tr>
</tbody>
</table>
Design of LCL Filter for Harmonic Suppression in Co-phase Railway Power Quality Conditioner  
Keng-Weng Lao, Man-Chung Wong, NingYi Dai, and Chi-Kong Wong  
University of Macau Faculty of Science and Technology, China

Control and Analysis of the Low Voltage DC Grid  
J. B. Wang$^1$ and D. Kao$^2$  
$^1$Chien Hin University of Science and Technology, Taiwan  
$^2$AcBel Polytech Inc., Taiwan

A Deadbeat Control Method for Circulating Current between Parallel-Connected Inverters  
Huagen Xiao$^1$, An Luo$^1$, Lisha Bai$^1$, Chunming Tu$^2$, Juan Zhou$^2$, and Qing Liu$^2$  
$^1$Hunan University, China  
$^2$Natural Electric Power Conversion and Control Engineering Technology Research Center, China

A Novel Power Management Strategy for Single Phase Storage-equipped Grid-connected PV Generation System  
Junchao Ma$^1$, Fanbo He$^1$, Zhengming Zhao$^1$, Feikong$^1$, and Chongjian Li$^2$  
$^1$Tsinghua University, China  
$^2$Research and Design Institute of Metallurgical Industry, China

A Fault Tolerant Dual Inverter Configuration for Islanded Mode Photovoltaic Generation System  
Madhukar Rao A, Umesh B S, and Sivakumar K  
Indian Institute of Technology Hyderabad, India
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1197</td>
<td>Research and Review on Quasi-Z Source grid connected Inverter</td>
<td>Ruizhe Huang and Daolian Chen</td>
<td>Fuzhou University, China</td>
</tr>
<tr>
<td>1060</td>
<td>PWAM Control of Bidirectional LLC Resonant Converter</td>
<td>Tianyang Jiang, Junming Zhang, Yousheng Wang, Zhaoming Qian, and Kuang Sheng</td>
<td>Zhejiang University, China</td>
</tr>
<tr>
<td>1195</td>
<td>Direct Methanol Fuel Cell Systems with Tri-stage Energy Management and Maximum Power Point Tracking</td>
<td>Yu-Hsiang Huang, Shih-Jen Cheng, Yu-Kang Lo, Huang-Jen Chiu, Shu-Wei Kuo, and Tai-Hung Wang</td>
<td>National Taiwan University of Science and Technology, Taiwan</td>
</tr>
<tr>
<td>1198</td>
<td>Construction and Control of an Energy Recycling Electronic Load System</td>
<td>Hao Ma and Qian Guo</td>
<td>Zhejiang University, China</td>
</tr>
</tbody>
</table>
P02  Applications of Power Electronics

Time: Monday, Nov. 4, 2013, 17:10 – 18:10
Place: Far Eastern Grand Ballroom (Level B2)
Chair(s): Prof. Grzegorz Benysek, University of Zielona Gora, Poland
          Prof. Le-Ren Chang-Chien, National Cheng Kung University, Taiwan

1188  Study on a New Power Modulation Strategy of HVDC to Improve Transient Stability in China Southern Power Grid
Huang Zhenlin¹, Zeng Yihao¹, Guan Lin¹, and Cao Jiandong²
¹South China University of Technology, China
²Guangdong Power Grid, China

1219  Power Loss Modelling of MOSFET Inverter for Low-Power Permanent Magnet Synchronous Motor Drive
Y. Yao, D. C. Lu, and D. Verstraete
University of Sydney, Australia

1227  Current Control for Single-Phase Grid-Connected Inverters by Splitting the Elements of LLCL Filter
Wenjun Liu, Fei Liu, Jianjun Sun, and Xiaoming Zha
Wuhan University, China

1020  A DC Capacitor Voltages Balancing Control Strategy for Cascade D-STATCOM
Pengkang Xie¹, Kun Yang¹, Chun Zhao², and Guozhu Chen¹
¹Zhejiang University, China
²Hunan Electric Power Corporation Research Institute, China

1038  Power Conditioner Interconnection Test System of Distributed Resources Based on IEEE 1547 Standard
Yu-Jen Liu, Pei-Hsiu Lan, Hong-Hsun Lin, Teng-Yi Chiu, and Hung-Wei Chen
Taiwan Electric Research and Testing Center, Taiwan
Applications of Power Electronics

Time: Monday, Nov. 4, 2013, 17:10 – 18:10
Place: Far Eastern Grand Ballroom (Level B2)
Chair(s): Prof. Grzegorz Benysek, University of Zielona Gora, Poland
Prof. Le-Ren Chang-Chien, National Cheng Kung University, Taiwan

1241
Research on Testing Platform for New Energy Grid-connected Devices 868
Shuang Zhao¹, Jianjun Sun¹, Liang Qin¹, Xiaoming Zha¹, and Kai Ding²
¹Wuhan University, China
²Hubei Power Company Electric Power Research Institute, China

1204
Torsional Vibration Suppression of the PMSG-based Wind Turbine Generator using H∞ Observer 880
Shuta Morinaga¹ and Toshihisa Funabashi²
¹University of the Ryukyus, Japan
²Meidensha Corporation, Japan

1034
Generalized DQ Model of the Permanent Magnet Synchronous Motor Based on Extended Park Transformation 885
Jinhai Liu and Wei Chen
Fuzhou University, China

1161
Prediction of State of Charge for Li–Co Batteries with Fuzzy Inference System based Fuzzy Neural Networks 891
Ho-Ta Lin and Tsorng-Juu Liang
National Cheng-Kung University, Taiwan

1046
Detection on SOC of VRLA Battery with EIS 897
Pin-Chien Wu, Wen-Chien Hsu, and Jiann-Fuh Chen
National Cheng-Kung University, Taiwan
**P02 Applications of Power Electronics**

**Time:** Monday, Nov. 4, 2013, 17:10 – 18:10  
**Place:** Far Eastern Grand Ballroom (Level B2)  
**Chair(s):** Prof. Grzegorz Benysek, *University of Zielona Gora*, Poland  
Prof. Le-Ren Chang-Chien, *National Cheng Kung University*, Taiwan

1130  
**Measurement of Resistance Characteristics of Power Cables in the Very High Frequency Band for Improving Electromagnetic Interference Analysis**  
Yutaro Fujimori, Satoshi Ogasawara, and Masatsugu Takemoto  
*Hokkaido University*, Japan

1142  
**Common-Mode EMI Suppression in a Unipolar PWM Inverter using Genetic-Based Gating Signals Tuning**  
En-Chih Chang, Chien-Hsuan Chang, Hung-Liang Cheng, and Tzu-Chun Yeh  
*I-Shou University*, Taiwan

1186  
**Evaluation on Chamber Volume and Performance for Simple Calorimetric Power Loss Measurement by Two Chambers**  
Koji Orikawa, Atsushi Nigorikawa, and Jun-ichi Itoh  
*Nagaoka University of Technology*, Japan