DC-capacitance Estimation of DC-link Capacitors using AC Voltage Injection in AC/DC/AC PWM Converters.......................................................................................................................... 2095
Ahmed. G. Abo-Khalil, Dong-Choon Lee

Constructing a Novel Power Converter by Matrix Converter Theory and Z-source Inverter Concepts for ISA 42 V PowerNet System.................................................................................. 2101
Keping You, M. F. Rahman

Single-phase to Three-phase DC-link Three-leg Converter with Minimization of the Capacitor Currents.......................................................................................................................... 2109

Author Index

Volume 5

INDUSTRIAL POWER CONVERTER COMMITTEE

Session 54—Soft Switching and Resonant Converters

High Efficiency, High Power Density DC–DC Converter with Wide Input Range........................................ 2115
Xiangcheng Wang, Feng Tian, Yinxing Li, Issa Batarseh

Comparison of Two Soft Switching DC–DC Converters for Fuel Cell Applications..................................... 2121
Aude Ivanes, Bang Viet Dang, Yves Lembeye, Jean Paul Ferrieux, Jean Barbaroux

A New High Frequency Linked Soft-switching PWM DC–DC Converter with High and Low Side DC Rail Active Edge Resonant Snubbers for High Performance Arc Welder................................. 2129
Khairy Fathy, Toshiimitsu Doi, Keiki Morimoto, Hyun Woo Lee, Mutsuo Nakaoka

Multiphase LLC Series Resonant Converter for Microprocessor Voltage Regulation...................................... 2136
Taotao Jin, Keyue Smedley

A New Circuit Geometry SAZZ for an EV Drive Application ........................................................................ 2144
Yukinori Tsuruta, Masaki Bando, Yoshihiro Ito, Atsuo Kawamura

LCC Zero-voltage-switching Buck Converter with Synchronous Rectifier.................................................. 2150
Osama Abdel-Rahman, Jun Liu, Liangbin Yao, Issa Batarseh, Hong Mao

N Interleaved Boost Converter with a Novel ZVT Cell Using a Single Resonant Inductor for High Power Applications........................................................................................................ 2157
Nam-Ju Park, Dong-Seok Hyun

ENERGY SYSTEMS COMMITTEE

Session 55—Energy System III

A Fully Analytical PEM Fuel Cell System Model for Control Applications................................................ 2162
Felix Grasser, Alfred C. Rufer

Cost Considerations on Fuel Cell Renewable Energy Systems...................................................................... 2169
M. Godoy Simoes, Caroline S. Uriarte, Felix. A. Farret

A Novel Motor Energy Monitoring Scheme using Wireless Sensor Networks........................................... 2177
Bin Lu, Thomas G. Habetler, Ronald G. Harley

xxxvii
Solid Oxide Fuel Cell/Gas Turbine Hybrid APU System for Aerospace Applications
Kaushik Rajashekara, James Grieve, David Daggett

PRODUCTION AND APPLICATION OF LIGHT COMMITTEE

Session 56—Light and Applications
Influence of Voltage and Frequency Dimming on Power Losses in HF Electronic Ballasts for Compact Fluorescent Lamps
Mohsin Ayaz Shafi, R. A. McMahon
Comparison of Class E and Half Bridge Inverters for Use in Electronic Ballasts
Ashish Ekbote, Donald S. Zinger
Physical and Mathematical Meaning of the Alpha Constant, Einstein’s Equation, and Planck Dimensions
Ed Hammer
Extended Simplification of Einstein’s Famous Equation
Ed Hammer
Predicted Resonance with Alpha Constant and Einstein’s Equation
Ed Hammer

POWER SYSTEM PROTECTION COMMITTEE

Session 57—Power System Protection II
On Outdoor Lighting Installations Grounding Systems
Massimo Mitolo
Power Lines Made by Many Parallel Single Core Cables: A Case Study
Fabio Freschi, Michele Tartaglia
Ferroresonance in a 13.8 kV Distribution Line
Peter E. Sutherland, Robert Manning
Voltage Sag Compensation with Z-source Inverter-based Dynamic Voltage Restorer
D. M. Vilathgamuwa, C. J. Gajanayake, P. C. Loh, Y.W. Li
A Parametric Model Approach to Arc Fault Detection for DC and AC Power Systems
S. Arunachalam, B. Diong
Automatic Bus Transfer Problems in the 6.3 kV Switchgear of Hellenic Petroleum Polypropylene Plant
S. J. Kiartzis

POWER ELECTRONICS DEVICES & COMPONENTS COMMITTEE

Session 58—Drive Circuits, Paralleling Considerations and EMI
Real-Time Optimization of IGBT/Diode Cell Switching under Active Voltage Control
Y. Wang, P. R. Palmer, T. C. Lim, S. J. Finney, A. T. Bryant
Optimized Gate Drivers for Internally Commutated Thyristors (ICTs)
Peter Köllensperger, Rik W. De Doncker
Experiment and Simulation Studies of Current Distribution in Paralleled Thyristors ........................................... 2276

Power MOSFETs Paralleling Operation for High Power High Density Converters ........................................... 2284
    Hongfang Wang, Fred Wang

High Frequency Modeling of a Converter with an RF-EMI Filter ................................................................. 2290
    Andrew C. Baisden, Dushan Boroyevich, Jacobus Daniel van Wyk

Layout Techniques for Reduction of Common Mode Current in Static Converters ........................................... 2296
    Jérémie Aimé, James Roudet, Christian Vollaire, Philippe Baudesson, Jacques Ecrabey

Simplified Design of Common Mode Chokes for Reduction of Motor Ground Currents in Inverter Drives ......................... 2304
    Annette Annette, Charles R. Sullivan

Electric Machines Committee

Session 59—Faults and Diagnostics I

Estimation of Static Eccentricity Severity in Induction Motors for On-line Condition Monitoring ......................... 2312
    Jason Grieger, Randy Supangat, Nesimi Ertugrul, Wen L. Soong, Douglas A. Gray, Colin Hansen

Monitoring of Induction Machine Currents by High Frequency Resolution Analysis ........................................... 2320
    Alberto Bellini, Fiorenzo Filippetti, Domenico Casadei, Amine Yazidi, Gerard Capolino

Detection of Rotor Faults in Field-oriented Controlled Induction Machines .................................................... 2326
    E. Serna, J. M. Pacas

Non-stationary Motor Fault Detection Using Recent Quadratic Time-frequency Representations .......................... 2333
    Satish Rajagopalan, Thomas G. Habetler, Ronald G. Harley, José A. Restrepo, José M. Aller

A Model of Dual Stator Winding Induction Machine in Case of Stator and Rotor Faults for Diagnosis Purpose ......................... 2340

Diagnosis of Rotor Faults in Closed Loop Induction Motor Drives ............................................................... 2346
    S. M. A. Cruz, A. J. M. Cardoso

Detection of Rotor Faults in Squirrel Cage Induction Motors using Adjustable Speed Drives .............................. 2354
    Carla C. Martins Cunha, Braz J. Cardoso Filho

Electric Machines Committee

Session 60—AC Machines and Generators

Stator Inter-turn Fault Detection of Synchronous Machines Using Field Current Signature Analysis .................. 2360
    Prabhakar Neti, Subhasis Nandi

Optimization of Shield Thickness of Finite Length Rotors for Eddy Current Loss Minimization ....................... 2368
    Manoj R. Shah, Sang Bin Lee

Prototyping a Composite SMC/Steel Axial-flux PM Wind Generator ............................................................ 2374
    M. A. Khan, P. Pillay, N. R. Batane, D. J. Morrison

Design and Analysis of a New Hybrid Excited Doubly Salient Machine Capable of Field Control .................... 2382
    Xiaoyong Zhu, Ming Cheng, Wei Hua, Jianzhong Zhang, Wenxiang Zhao
Over-current Simulation Test for High Temperature Superconducting Generator ....................................... 2390
  Wensen Wang, Liang Li, Tao Zhang, James Alexander, Xianrui Huang, Trifon E. Laskaris,
  James. W. Bray, James M. Fogarty

Performance and Vibration Analysis of a 75 kW Brushless Double-fed Induction Generator Prototype .... 2395
  F. Runciós, R. Carlson, N. Sadowski, P. Kuo-Peng, H. Voltolini

Design of Flux-switching Permanent Magnet Machine Considering the Limitation of Inverter and
Flux-weakening Capability .................................................................................................................. 2403
  Wei Hua, Ming Cheng, Z. Q. Zhu, D. Howe

INDUSTRIAL DRIVES COMMITTEE

Session 61—Induction Machine Drives II

Frame Alignment Stability Issues in Natural Field Orientation ............................................................... 2411
  R. E. Betz, G. Mirzaeva

An Unique Ultracapacitor Direct Integration Scheme in Multilevel Motor Drives for Large Vehicle
Propulsion ........................................................................................................................................... 2419
  Shuai Lu, Keith A. Corzine, Mehdi Ferdowsi

Observer-based Estimation of Stator Winding Faults in Delta-connected Induction Motors: An LMI
Approach ............................................................................................................................................ 2427
  Carsten Skovmos Kalesøe, Pierre Vadstrup, Henrik Rasmussen, Roozbeh Izadi-Zamanabadi

A New Method for Induction Motors Parameter Estimation Using Genetic Algorithms and Transient
Speed Measurements ....................................................................................................................... 2435
  Andrew Trentin, Pericle Zanchetta, Patrick Wheeler, Jon Clare, Robert Wood, Dimos Katsis

Direct Torque Control with Reduced Switching Losses for Asymmetric Multilevel Inverter-fed
Induction Motor Drives .................................................................................................................... 2441
  Samir Kouro, Rafael Bernal, Hernán Miranda, José Rodríguez, Jorge Pontt

A Luenberger-sliding Mode Observer for On-line Parameter Estimation and Adaptation in High-
performance Induction Motor Drives .............................................................................................. 2447
  S. M. Nayeem Hasan, Iqbal Husain

INDUSTRIAL DRIVES COMMITTEE

Session 62—Drives II

A Protection of the Electrolytic Capacitor-less Drive System against the Input Grid Interruption .............. 2454
  Wook-Jin Lee, Seung-Ki Sul, Young-Seok Shim

Integration of the Measurement Vector Insertion Method (MVIM) with Discontinuous PWM for
Enhanced Single Current Sensor Operation ...................................................................................... 2459
  Hongrae Kim, Thomas M. Jahns

Compensation of Zero-current Clamping Effects for Sensorless Drives Based on High-frequency
Signal Injection .................................................................................................................................... 2466
  Chan-Hee Choi, Jul-Ki Seok

Slip Gain Estimation for Indirect Field Controlled Drives Using Stator Transient Signals ........................ 2472
  Juan M. Guerrero, Michael W. Degner, Fernando Briz
Application of General Space Vector Modulation Approach of AC–AC Matrix Converter Theory to a New Bidirectional Converter for ISA 42 V System
Keping You, M. F. Rahman

Sensorless Speed Control of Traveling Wave Ultrasonic Motor
Markus Flueckiger, Matteo Bullo, Yves Perriard

Novel Converter Concept for Bearingless Slice Motor Systems
Martin T. Bartholet, Thomas Nussbaumer, Peter Dirnberger, Johann W. Kolar

INDUSTRIAL POWER CONVERTER COMMITTEE

Session 63—DC/DC Converters
High Efficiency and Fully Integrated Self Powering Technique for VIPer-based Flyback Converters
Nicolas Rouger, Stéphane Catellani, Jean-Christophe Crébier

Robust Controller Using Polynomial Chaos Theory
A. Smith, A. Monti, F. Ponci

High Efficient Interleaved Multi-channel DC–DC Converter Dedicated to Mobile Applications
Blaise Destraz, Yannick Louvrier, Alfred Rufer

Design of a Redundant Paralleled Voltage Regulator Module System with Improved Efficiency and Dynamic Response
Santanu K. Mishra, Steve Zhou, Wenkang Huang, George Schuellein

Implementing Power Buffer Functionality in a DC–DC Converter by Geometric Control
Wayne W. Weaver, Philip T. Krein

Quasi Linear DC–DC Converters
Deepak M. Divan, Satish Rajagopalan

A Novel Current Tripler Rectification Topology for Isolated DC–DC Converters in High Current Applications
Liangbin Yao, Osama Abdel-Rahman, Issa Batarseh, Hong Mao

INDUSTRIAL POWER CONVERTER COMMITTEE

Session 64—Control Applications and Issues (includes Drives and EMI)
Intracorporeal Microvalve Activation System Using a Transcutaneous Parallel Resonant Converter without Magnetic Core
Alberto M. Pernía, Iván C. Orille, J. A. Martínez, J. Martín-Ramos, J. A. Canal

High Efficiency Energy Storage System Design for Hybrid Electric Vehicle with Motor Drive Integration
Shuai Lu, Keith A. Corzine, Mehdi Ferdowsi

Optimal Design of a Hybrid Winding Structure for Planar Contactless Battery Charging Platform
Xun Liu, S. Y. Hui

Control of an Open Winding Machine in a Grid-connected Distributed Generation System
Mu-Shin Kwak, Seung-Ki Sul

Design Optimization of Industrial Motor Drive Power Stage Using Genetic Algorithms
F. Wang, W. Shen, D. Boroyevich, S. Ragon, V. Stefanovic, M. Arpilliere
Investigation of the Near Field Coupling Effects on Common Mode EMI in Power Converter .......................... 2587
Wei Chen, Limin Feng, Henglin Chen, Zhaoming Qian

Analysis and Experimental Results of Load Adaptive Voltage Regulator for Battery Powered Applications ........................................................................................................... 2593
Jaber A. Abu Qahouq, Lilly Huang, Osama Abdel-Rahman, Issa Batarseh

PRODUCTION AND APPLICATION OF LIGHT COMMITTEE

Session 65—Special Session on LEDs

LEDs in Real Lighting Applications: From Niche Markets to General Lighting .................................................. 2601
Matthias Wendt, Jan-Willem Andriesse

Advanced Electronic Driver for Power LEDs with Integrated Colour Management .......................................... 2604
Franz Bernitz, Oskar Schallmoser, Wolfram Sowa

Control of LEDs .................................................................................................................................................. 2608
B. Ackermann, V. Schulz, C. Martiny, A. Hilgers, X. Zhu

Illumination and Color Management in Solid State Lighting ............................................................................ 2616
Kevin Lima, Joon Chok Lee, George Panotopoulos, Rene Helbing

Driver Electronics for LEDs ............................................................................................................................... 2621
Georg Sauerländer, Dirk Hente, Harald Radermacher, Eberhard Waffenschmidt, Joep Jacobs

POWER SYSTEM PROTECTION COMMITTEE

Session 66—Power System Protection III

Analysis and Design of GaInSn Current Limiter .................................................................................................. 2627
Huaren Wu, Xiaohui Li, Min Zhang, D. Stade, H. Schau

Comprehensive Design of Electrical Installations by Integrating System Configuration and Operational Safety Aspects ........................................................................... 2631
Erling Hesla, Giuseppe Parise, Rasheek M. Rifaat

Effect of Single-phase Reclosing on Industrial Loads ......................................................................................... 2636
Peter E. Sutherland, Tom A. Short

Grounding Fault Protection with Phase Current Difference for Ineffectively Earthed Power Systems ........ 2645
Wang Yuanyuan, Zeng Xiangjun, Su Sheng

Author Index ......................................................................................................................................................... 2651