

**2006 2nd International Conference
on Power Electronics
Systems and Applications
Proceedings**

12 November to 14 November 2006

Chiang Chen Studio Theatre

The Hong Kong Polytechnic University

Hong Kong

The conference is organized by

Power Electronics Research Centre

The Hong Kong Polytechnic University

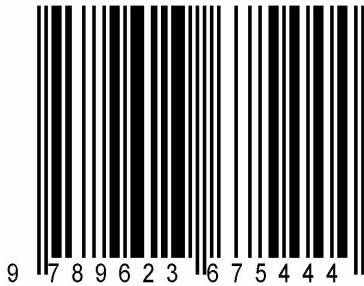
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2nd International Conference on Power Electronics System and Applications (PESA06)

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The Hong Kong Polytechnic University

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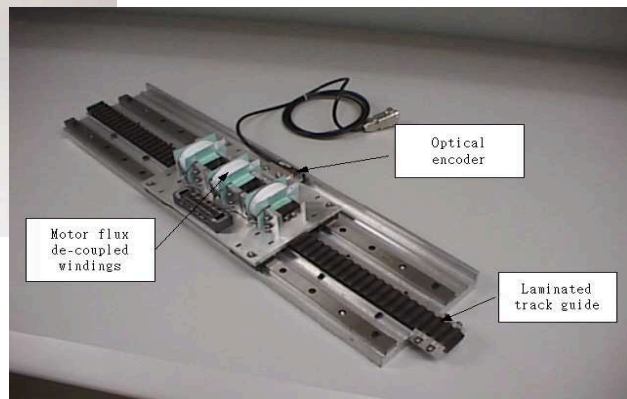
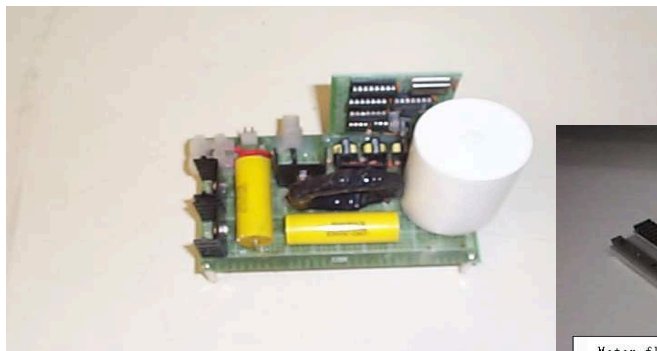
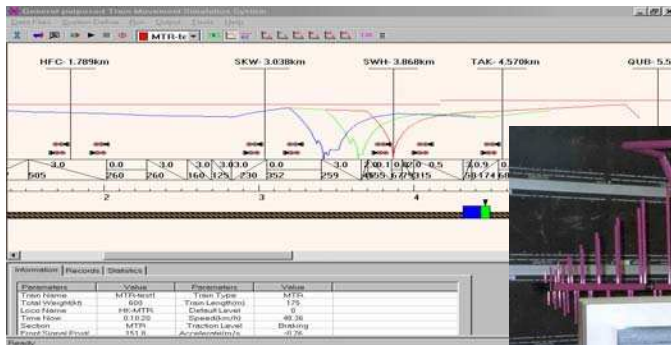


THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

Power Electronics Research Centre (PERC)

<http://perc.polyu.edu.hk>

The centre has 20 academic staff members and a number of research personnel. We have equipment and facilities for electromagnetic compliance testing, power conversion testing, environmental testing and computer aided design. We specialise in all aspects of power electronics, motor drives and traction system.



We are now inviting industrial members to join the centre. There are individual and corporate memberships. As members, you will receive our publications and enjoy discounts for all the functions organized by us.

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Preface

Power Electronics is an emerging technology that brings the power conversion into a higher degree of efficiency, control, power density. It is now being used in all sorts of application including static power conversion and motion control. It has been developing rapidly in the last 20 years and has received attention by the industry and public. Today, our daily life is full of electronic devices or systems. For examples, all the audio or video entertainment devices have a switched-mode power supply that converts mains voltage to low voltage DC for the electronic circuits. The personal computers require a power supply or an adaptor which is a power electronic converter. The electronic ballasts for fluorescent or HID lamps are also composed of a power factor correction and an inverter. Air-conditioning and ventilation system is driven by inverters using variable speed drive. All the mass transportation systems including train, cable-car and peak tram are driven by power electronic inverters. Elevators and escalators in the buildings are driven by inverters. All the battery chargers are also switched-mode circuits. Power distribution and transmission are using power electronics for protection, and certain degree of power processing. Automotive and aerospace parts and component are moving towards electric versions. Therefore power electronics is part of our life.

The International Conference on Power Electronics Systems and Applications (PESA) is to provide a forum for the exchange and dissemination of technical information on research, development and experience in power electronics. We have invited speakers from power supply companies, consultancy and engineering firms, and universities to present wide range of topics. This is the 2nd time we organize the conference. More than 50 papers are presented by experienced engineers and professors. They cover practical topics in power conversion, motor and drives. For your information, the conference proceedings will be made available in the Website of The Power Electronics Research Centre of the university: <http://perc.polyu.edu.hk>.

On behalf of the organizing committee and the university, we wish to thank again for your support to the events. We are sure you all will enjoy the conference.



*Eric Cheng
General Chair
November 2006*

Program at a Glance

Time	Monday 13 November 2006	
8:30	Registration	
8:50	Opening	
	Morning Session 1: Venue: Chiang Chen Studio Theatre	
10:55	Coffee break	
11:10	Morning Session 2: Venue: Chiang Chen Studio Theatre	
13:00	Lunch: Venue: Staff Restaurant (4/F., Communal Bldg)	
14:00	Afternoon Session 3A: Venue: Chiang Chen Studio Theatre	Afternoon Section 3B: Motors and Magnetics Venue: EF311
15:30	Tea break	
15:45	Afternoon Session 4A Venue: Chiang Chen Studio Theatre	Afternoon Section 4B: High Power Venue: EF311
17:45	Finish	
Tuesday 14 November 2006		
9:00	Morning Section 5: Keynote Speech Venue: Chiang Chen Studio Theatre	
	Prof. Philip Krien (IEEE Distinguish Lecture) Prof. Prof. Liao Xiaozhong	
10:50	Coffee break	
11:05	Morning Section 6: Converter and Inverter Venue: Chiang Chen Studio Theatre	
12:50	Lunch: Venue: Staff Restaurant (4/F., Communal Bldg)	
14:00	Afternoon Section 7A: Lighting Venue: BC304	Afternoon Section 7B: Automotive and Devices Venue: EF402 / EF405
15:45	Tea break	
16:00	Afternoon Section 8A: Motors and Drives Venue: BC304	Afternoon Section 8B: Power Quality and Converter Venue: EF402 / EF405
17:45	Finish	

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Monday 13 Nov 2006

Morning Session 1

Venue: Chiang Chen Studio Theatre

08:50

Chair: Prof. Eric Cheng

Mr. Sean McCabe	Electrical Resins for today and tomorrow	Switch mode power supply
/Dr. Rohn Grant		
Dr. James R. Cox	Current and New Applications Using Micrometals Iron Powder and 200C Series Core Materials	
Prof. Eric Cheng	Tapped inductor for switched-mode power converter	

Morning Session 2

Venue: Chiang Chen Studio Theatre

11:10

Chair: Dr. Kevin Chan

Dr. Ed Van Vooren	Electrical Insulation Systems [EIS] Applications from General Commercial to Automotive	
Dr. Kevin Chan	A Practical Dynamic Phasor Model of Static VAR Compensator	

Afternoon Session 3A

Venue: Chiang Chen Studio Theatre

14:00

Chair: Dr. Norbert Cheung

Dr. Richard Barden	Cost Savings at the Expense of Quality, Safety, and the Environment. A Plastic Molding Example	
Dr. Gregory Lau	Introduces Zytel® High Temperature Nylon HTN and Zentie® LCP	
Dr. Norbert Cheung	High Performance Linear Actuation Systems	

Afternoon Session 4A

Venue: Chiang Chen Studio Theatre

15:45

Chair: Dr. Edward Lo

Dr. Sunsan Welsh	Triple insulation wire in switching power supply design	
Mr. William Choi	Voltage and Pulse Endurance Test of New Generation wire CORONA-R TH developed by BC wire ®	
Dr. W.K. Cheung	Optimization Design of Highly Efficient Aluminum-Alloy Sinks for Electronic Products – Part I	
Dr. W.K. Cheung	Optimization Design of Highly Efficient Aluminum-Alloy Sinks for Electronic Products – Part II	
Dr. W.K. Cheung	Optimization Design of Highly Efficient Aluminum-Alloy Sinks for Electronic Products – Part III	
Dr. Edward Lo	Recent Projects of Building Integrated Photovoltaic in Hong Kong	

Afternoon Session 3B

Venue: EF311

14:00

Motors and magnetics

Dr. Che Yanbo	Variable gain intelligent control of multi-motor synchronization system
Mr. W.T.Wu	Temperature Dependence of Magnetic Properties of a Polymer Bonded Magnetic Material
Dr. J.Merrikhi	Laminated Iron Core Inductor Model with Flux Skin Effect
Dr. X.D.Xue	A Control Scheme of Torque Ripple Minimization for SRM Drives Based on Flux Linkage Controller and Torque Sharing Function
Dr. Ajay M. Chole	Performance Study on Piezoelectric Transformers
Dr. Kai Ding	Research on Polymer-Bonded Magnetic Materials for a buck converter

Afternoon Session 4B

Venue: EF311

15:45

High power

Dr. GAO Yanxiz	The Parameters Identification and Validation for IGBT Base on Optimization Algorithm
Dr. A.K. Singh	Impact of Source Voltage Unbalance on AC-DC Rectifier Performance
Dr. M.H. Saied	New Three-level Voltage Source Inverter with Different 25 Space Voltage Vectors
Dr. J. Merrikhi	Modeling Flux Skin Effect on the Harmonic Currents of TCR
Dr. Yang. B.B.	How does the manufacturer practise environmental protection rules in the market
Mr. H.Pang	DC Electrical Distribution Systems in Buildings
Mr. Zhou Fudan	Shunt Active Power Filter – SIMULINK Simulation and DSP-based Hardware Realization
Dr. Che Yanbo	The Optimal Parameters Design of HTS-SMES Magnets

Tuesday 14 Nov 2006Morning Session 5
09:00Venue: Chiang Chen Studio Theatre
Keynote Papers

Prof. Philip Krein	Hybrid and Electric Automotive Systems: Combined Electrical, Mechanical, and Fuel Cell Opportunities for Personal Transportation
Prof. X.Z. Liao	Application of Active Disturbance Rejection Controller in Stator Flux Oriented Vector Control System

Morning Session 6
11:05Venue: Chiang Chen Studio Theatre
Converter and Inverter

Mr.Katsuyoshi Takeo	Multi-Layer Power Inductor and DC/DC converter
/Mr.Shigenori Suzuki	
Dr. Lei Dong	Speed Sensorless Control with Neuron MARS Estimator of An induction Machine
Dr. Martin Chow	Performance Considerations of PFC Switching Regulations Based on Non-Cascading Structures

Afternoon Session 7A
14:00Venue: BC304
Lighting

Ms. Carmen, Cheng	Develop a web tool for Electrical Engineering Courses
Dr. H.L.Chan	Study on Magnetic Materials Used in Power Transformer and Inductor
Mr. C.K.Cheong	Examination of T8-T5 Electronic Ballast Adaptor
Ms. Y.K.Cheng	General Study for using LED to replace traditional lighting devices
Ms. P.Dong	General Discussion on Dimming Control Method Used for Discharge Lamp
Mr. K.F.Kwok	General study for design the HID ballasts

Afternoon Session 8A
16:00Venue: BC304
Motors and Drives

Mr. S.C. Kwok	Improvements in the Mechanical Structure of the Linear Switched Reluctance Motor
Mr. S.W.Zhao	Experiments in the Position Detection of Linear Switched Reluctance Motor
Mr. Shi Zhang-hai	Simulation Research of the Matrix Converter Based on Direct Torque Control
Mr. T.M.P. Fung	Cordless Printed Circuit Board Transformers for Power Transfer in Neuroprosthesis
Mr. Y.L.Ho	Maintenance techniques for rechargeable battery using pulse charging
Mr. Y.T. Chang	Comparison of Three Types of Induction Motor Control

Afternoon Session 7B
14:00

Venue: EF402/EF405
Automotive and devices

Dr. J.B. Jiang	Design and fabrication of freeform reflector for automotive headlamp
Dr. B.P.Divakar	Study of Dimming Control Methods For HID Automotive Lamps
Mr. D.H.Wang	Development of an Automotive HID Electronic Ballast Based Microprocessor
Mr. C.K. Chan	Development of Packaging and Electrical Interfacing for Electrical Vehicles
Dr. X.D.Xue	An Energy-Saving Scheme of Variable Voltage Control for Three-Phase Induction Motor Drive Systems

Afternoon Session 8B
16:00

Venue: EF403/EF405
Power Quality and converter

Dr. Che Yanbo	Real-time Simulation and Experiment Platform for Switched Reluctance Motor
Dr. K. Ding	A Novel Detection Method for Voltage Sags
Mr. Yu Zou	Neural Network Hysteresis Control of three-phase Switched Capacitor Active Power Filter
Dr. H.F.Ho	Adaptive Passivity-Based Control of Extended-Period Quasi-Resonant Converters
Dr. J.Merrikhi	Harmonic Mitigation Potential of Inductive Shunt Harmonic Impedances
Ms. C.D.Xu	Study of Intermittent Bifurcations and Chaos in Buck-Boost Converters with Input regulators
Ms. P.Yang	A Practical Intelligent Home System Based on Power Line Communication