



International Conference on Power Systems Transients - IPST 2011 Delft, The Netherlands



Tuesday 14th June to Friday 17th June

hosted by
Delft University of Technology
Faculty of Electrical Engineering, Mathematics and Computer Science

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S
Technologies

Main sponsor of IPST 2011

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IPST2011 Local Organizing Committee

Co-Chairpersons : M. Popov (The Netherlands), L. van der Sluis (The Netherlands)

Committee Members : M. van Riet (Alliander), R. Smeets (Kema), A. Janssen (Liander), J. Langedijk (Siemens), J. Kanters (TenneT), A. Wiersma (Stedin), J.J. Smit (Delft University of Technology), G. Schoonenberg (Eaton Electric B.V.), J.A. Ferreira (Delft University of Technology), M. Michiels (Alstom Grid Nederland)

Welcome Message

Dear colleagues,

On behalf of the Steering, Technical and Local Organizing Committees, we have the pleasure of welcoming you to the International Conference on Power Systems Transients (IPST 2011) in the historical city of Delft, The Netherlands.

The history of the IPST started in 1993: the first European Conference on Power Systems Transients-EPST '93 was held in Lisbon on June 16-18, 1993. The goal of this conference was to promote the study of power systems transients by offering a common platform of scientific and technical excellence. Technical contributions came from EMTP users and also from the scientific community involved in all topics related to the study of transient phenomena in electric energy systems. An idea emerged to repeat the conference on a two year basis. The very positive response to EPST '93 continued to strengthen the involvement of the international power systems transients' scientific community, and the International Conference on Power Systems Transients was born in 1995.

The number of abstracts submitted to the IPST 2011, more than 230 from 58 countries, confirms the interest that this conference has generated. The International Technical Program Committee which was chaired by Profs. Reza Iravani and Washington Neves was very busy and had a difficult and challenging task. More than 120 contributions will be presented at IPST 2011, covering all topics related to the study of transient phenomena in electric energy systems and future power systems.

Many individuals and institutions have contributed to make this conference successful. We wish to express our deepest gratitude and appreciation to the Technical Program Committee members and the Steering Committee members. Many thanks go to the main sponsor of the IPST 2011, RTDS Technologies Inc., and the other sponsors who acted on their wish to help the conference to the best of their ability and to make it more enjoyable and memorable for the participants. Special thanks go to the session chairs and, last but not least, to all the authors of the conference.

We hope that you will take the time to enjoy Delft and the wonderful area of Randstad.

Enjoy the IPST 2011

IPST 2011 Local Organizing Committee

Chairpersons: Marjan Popov and Lou van der Sluis

1. Flying to The Netherlands

Delft is located about 50 km from Schiphol, which is about 20 km south of Amsterdam and is the largest airport in the Netherlands. Schiphol handles regular scheduled flights to more than 150 destinations of almost all continents.

2. How to reach Delft Central Station and your hotel

Public transport in the Netherlands is well organized and trains provide quick and efficient service between the airport and all cities in the Netherlands. The ticket office is located in the main hall of the airport. There are frequent trains from Schiphol airport to Delft with one stop either in Leiden or in The Hague. The ticket is valid for one journey, no reservation is required and it is valid for the whole day. A second class single fare from Schiphol to Delft costs 8.7 Euro. More information including a journey planner and travel times can be found on www.ns.nl. When you arrive in Delft, you can reach your hotel either by taking a taxi or a bus. More about the bus travel times can be found on www.9292ov.nl.

3. Climate

In general, the weather in the Netherlands can be variable even though the month June is in the summer season. In this period the weather is normally fine and the average temperature is around 20 °C. It is recommended to check the weather forecast before departure on <http://www.accuweather.com> or <http://www.weeronline.nl/>. It is also worth mentioning that in June the day is quite long and it gets dark around 22:00h.

4. Other Information

1. Official Language

The official language of IPST 2011 is English. All official documents associated with the IPST 2011 should be English.

2. Name Tag

All registered participants are requested to wear name tags (provided by the organization) in order to join Technical Sessions and Social Programs. Please wear your name tags at all times during the conference period.

3. The conference location

The conference will take place at the Delft University of Technology. The registration, presentations, catering and exhibitions will be in building 35, which is located on the Cornelis Drebberweg 5. The opening ceremony will take place in building 36 (Faculty of Electrical Engineering), which is the tall red building across the road and to the east of the conference building. Its front entrance is at Mekelweg 4, while the back side of the building is on the Feldmannweg (see the campus map supplied with the conference material).



4. Registration

The registration will start on Tuesday at 8.30am. The conference material can be picked up at the conference desk in building 35.

5. Instructions for Paper Presentation

The conference is organized in 25 technical sessions with 5 papers per session. Each session has duration of 100 minutes. Refreshments will be available for delegates during the coffee breaks. Three sessions will run simultaneously and each session is headed by a chairperson. Each presenter has 15 minutes for the presentation of the paper plus 5 minutes for questions and discussion which will be moderated by a chairperson.

6. Guidelines for paper presentation

The following facilities are available for each technical session: Windows-based Computer and LCD-projector. Power point files of the paper presentations should be sent to the co-chairman Marjan Popov, by means of the following e-mail address:

M.Popov@tudelft.nl no later than June 9 in your local time. Please specify in which session your paper belongs and name the file using the format ID.ppt where the ID is the number of your paper as it appears in the conference program.

7. Author coffee

The author coffee will be served from Wednesday till Friday in the conference centre. To communicate with the session chairperson, it is recommended to take part in the author coffee where you will receive instructions. The authors are kindly requested to proceed to the session room 15 minutes before the session start time. Please also provide your brief CV to the session chairpersons during the authors' coffee. During the technical sessions there will be room managers appointed to take care of uploading the presentations and helping with the PC's and audio equipment.

8. Message Board

Any program changes or urgent announcement from the Secretariat and person-to-person messages will be posted on the Message Board located near the Registration Desk. Please check the board occasionally.

9. Secretariat Office

There will be no secretariat office. We kindly suggest addressing all questions to the registration desk and to inform the chairpersons of the conference sessions.

10. Internet and e-mail access:

An internet access (wireless LAN) will be available within the university. A guest account will be provided for all registered participants.

11. Welcome reception

The welcome reception will take place at the city hall of Delft on Tuesday, 14th June from 19:00h to 20:30h. The authors and participants are kindly requested to be there around 19:00h. During the welcome receptions, the IPST participants will be welcomed by the mayor of Delft, Mr. Bas Verkerk. The address of the city hall is: Stadhuis van Delft, Markt 87, Delft and it is located in the city's central market square.



12. Banquet dinner

The IPST participants will have a banquet dinner on Wednesday, the 15th of June on a cruise at the harbor of Rotterdam. The busses will depart around 17:30h from in front of Building 35 where the conference takes place. It is suggested that all participants who will attend the banquet dinner be present 5 to 10 minutes in advance in order to avoid any possible delays. It is expected that the dinner will be finished around 22.00h. Afterwards, the busses will go from hotel to hotel with the last stop at TU Delft from where the bus had initially departed. Please be aware that the busses will only stop in front of those hotels which have been proposed by the local organizing committee. In case some participants stay in hotels they have chosen themselves, they will be dropped in front of the conference building or at the Delft railway station, where they can take taxi, bus or train to their hotel. The number of banquet dinner attendees is strictly related to the registered participants. Only the professional and accompanying person registration covers the banquet dinner. Student registration does not cover the banquet dinner and those students who would like to attend should contact us as soon as possible so that extra tickets can be provided. The banquet dinner ticket costs 100 Euro.

13. Technical excursion

The technical excursion will take place on Thursday, 16th June after the morning sessions are finished. Only the first 90 registered participants (2 busses) can attend the technical excursion. In case some of the registered participants decide to not attend the technical excursion, the free seats will be given to those who are next on the list. The excursion is sponsored by Kema Laboratories. Kema High Power Laboratories are located in Arnhem, which is about 125 km away from Delft. The busses will depart around 11 o'clock in front of the conference building. Excursion participants will receive a packaged lunch.

5. Restaurants and Cafés

Delft is a city with approximately 100.000 inhabitants. There are a lot of restaurants from different origin. All restaurants are listed on <http://www.eet.nu/delft>. Although the webpage is in Dutch, the link with details is provided for every restaurant.

6. Companions

There is no special program prepared for those registered as companions, as their number was small. However, it is suggested to visit one's hotel lobby for a coffee and ask the receptionists for interesting events, museums and other places to visit in the cities of Delft, Rotterdam and The Hague. The Hague and its beach area Scheveningen are easily reachable by a tram whilst the journey to Rotterdam takes approximately 15 minutes by a train.

CONFERENCE PROGRAM

DAY	TIME	ROOM	SESSION NAME	PAPER ID	
Tue 14	9:15 – 10:55	1A	System Protection and Fault Location I	24, 36,37,57,70	
		1B	Switching and Fault Transients I	63,65,94,116,119	
		1C	Inrush Currents, Ferroresonance and SSR I	6, 25,40,211,121	
	11:10 – 12:00		Opening Ceremony (Room A – Faculty of EEMCS)		
	12:00 – 13:15		LUNCH		
	13:20 – 15:00	2A	Solution Methods and Model. Techniques I	41,237,66,82	
		2B	Transmission lines and cables I	139, 52,76,96,106	
		2C	Very Fast Transients	34, 48,72,123,185	
	15:20 – 17:00	3A	Real Time Digital Simulators and TNAs I	84, 88, 102,133,148	
3B		Lightning Surges	15, 38,111,115		
3C		Power Systems dynamics and control	35, 46,55,202,247		
19:00 – 20:30		Welcome Reception – Delft City Hall			
Wed 15	8:30 – 9:00		Authors' breakfast/coffee		
	9:20 – 11:00	4A	Real Time Digital Simulators and TNAs II	163,194,244,248,159	
		4B	System protection and Fault Location II	80, 92,100,120,125	
		4C	Transformers and Rotating Machines	7,47,91,224,122	
	11:20 – 13:00	5A	Inrush Currents, Ferroresonance and SSR II	141, 36,212,54,241	
		5B	Transmission Lines and Cables II	193,157,176,182,200	
		5C	Solution Methods and Model. Techniques II	90,78,240,112,233	
	13:00 – 14:15		LUNCH		
	14:20 – 16:00	6A	Switching and Fault transients II	Visit to the RTDS facility	21, 26,31,103,220
		6B	Power Electronics and FACTS		137,192,144,219
6C		Simulation Tools	39, 61,77,129,227		
16:00 – 17:00		Visit to the RTDS facility			
17:30 – 22:00		Banquet Dinner			
Thu 16	8:30 – 9:00		Authors' breakfast/coffee		
	9:20 – 11:00	7A	Switching and Fault Transients III	20,127,128,155,162	
		7B	System Protection and Fault Location III	161,196,210,225,242	
		7C	Solution Methods and Model. Techniques III	158,165,184,99, 4	
			(packaged) LUNCH		
11:00 – 18:00		- Technical visit to KEMA	12h – 14:30h (Room A) What's new in PSCAD X4?		
	8:30 – 9:00		Authors' breakfast/coffee		
Fri 17	9:20 – 11:00	8A	Transmission Lines and Cables III	199,215,218,229,245	
		8B	Distributed Generation	53,68,113,108,109	
	11:20 – 13:00	9A	Switching and Fault Transients IV	64,188, 221,230,246	
		9B	Harmonics and Power Quality	50,83,118,164,89	
	13:00 – 14:30		LUNCH		
	14:30 – 15:30		Closing session (building 35)		

Day	Time	Session ID	Session name	Chair Person	Paper ID
Tue 14	9:15 – 10:55	1A	System Protection and Fault Location I	A. Janssen	24, 36,37,57,70
		1B	Switching and Fault Transients I	H. W. Dommel	63,65,94,116,119
		1C	Inrush Currents, Ferroresonance and SSR I	S. Denetiere	6, 25,40,211,121
	13:20 – 15:00	2A	Solution Methods and Model. Techniques I	T. Noda	41,237,66,82
		2B	Transmission Lines and Cables I	A. Ramirez	139, 52,76,96,106
		2C	Very Fast Transients	R. Smeets	34, 48,72,123,185
	15:20 – 17:00	3A	Real Time Digital Simulators and TNAs I	L. van der Sluis	84, 88, 102,133,148
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		3C	Power Systems Dynamics and Control	V. Terzija	35, 46,55,202,247
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		4B	System Protection and Fault Location II	M.M. Saha	80, 92,100,120,125
		4C	Transformers and Rotating Machines	F. Moreira	7,47,91,224,122
	11:20 – 13:00	5A	Inrush Currents, Ferroresonance and SSR II	H. Hoidalén	141,136,212,54,241
		5B	Transmission Lines and Cables II	A. Ametani	193,157,176,182, 200
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		7B	System Protection and Fault Location III	C. H. Kim	161,196,210,225,242
		7C	Solution Methods and Model. Techniques III	A. Abur	158,165,184,99,4
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		8B	Distributed Generation	M. Paolone	53,68,113,108,109
	11:20 – 13:00	9A	Switching and Fault Transients IV	A. Xemard	64,188,221,230,246
		9B	Harmonics and Power Quality	M.T. Correia de Barros	50,83,118,164, 89

Tuesday 14 June

9:15 – 10:55

Session 1A - System Protection and Fault Location I

Chair: A. Janssen

24 - Using TT-transform for Fault Location in Three Terminal Power Transmission lines

A. Ahmadimanesh, Iran University of Science and Technology, Iran

S. M. Shahrtash, Iran University of Science and Technology, Iran

36 - Fault Location on Transmission Lines Based on Travelling Waves

F. V. Lopes, Federal University of Campina Grande, Brazil

D. Fernandes Júnior, Federal University of Campina Grande, Brazil

W. L. A. Neves, Federal University of Campina Grande, Brazil

37 - Correction of the Secondary Voltage of Coupling Capacitor Voltage Transformers in Real Time

C. A. Silva, Federal University of Campina Grande, Brazil

D. Fernandes Júnior, Federal University of Campina Grande, Brazil

W. L. A. Neves, Federal University of Campina Grande, Brazil

57 - Location of Underground Cable Transitory Faults

C. J. Kim, Howard University, USA

T. Bialek, San Diego Gas & Electric, USA

M. Lehtonen, Aalto University, Finland

M. Abdel-Fattah, Aalto University, Finland

70 - ATP-EMTP Investigation of Distance Protection and High-speed Phase Selection Algorithms for Series-compensated Transmission Lines

M. M. Saha, ABB AB, Substation Automation Products,

Sweden

E. Rosolowski, Wroclaw University of Technology, Poland

J. Izykowski, Wroclaw University of Technology, Poland

P. Pierz, Wroclaw University of Technology, Poland

P. Balcerek, ABB Corporate Research, Krakow, Poland

M. Fulczyk, ABB Corporate Research, Krakow, Poland

9:15 – 10:55

Session 1B - Switching and Fault Transients I

Chair: H. W. Dommel

63 - Energy stresses of surge arresters due to temporary overvoltages

B. Filipovic-Grcic, Faculty of electrical engineering and computing, University of Zagreb, Croatia

I. Ugljesic, Faculty of electrical engineering and computing, University of Zagreb, Croatia

V. Milardic, Faculty of electrical engineering and computing, University of Zagreb, Croatia

A. Xemard, EDF R&D, France

A. Guerrier, RTE, France

65 - Simulation of the 500 kV SF6 circuit breaker cutoff process during the unsuccessful three-phase autoreclosing

I. Naumkin, Siberian Electric Power Research Institute, Russian Federation

M. Balabin, Siberian Electric Power Research Institute, Russian Federation

N. Lavrushenko, Siberian Electric Power Research Institute, Russian Federation

R. Naumkin, Siberian Electric Power Research Institute, Russian Federation

94 - Impact of Transformer Modeling in Assessing Dielectric Failure Analysis

A. C. O. Rocha, Cemig, Brazil

A. Lima, Federal University of Rio de Janeiro, Brazil

A. M. Pena, Cemig, Brazil

S. O. Moreira, Cemig, Brazil

116 - Breaking Capability of a SF6 Circuit Breaker for Short Circuits Close to a Generation Unit with Delayed Current Zero Crossing

M. Kizilcay, University of Siegen, Germany

119 - TRV Phenomenon in Chinese 1100kV UHV Series Compensated System

B. Zheng, China Electric Power Research Institute, China

Z. Xiang, China Electric Power Research Institute, China

L. Ban, China Electric Power Research Institute, China

J. Lin, China Electric Power Research Institute, China

N. Gu, China Electric Power Research Institute, China

G. Sun, State Grid Corporation of China, China

B. Han, China Electric Power Research Institute, China

9:15 – 10:55

Session 1C - Inrush Currents, Ferroresonance and SSR I

Chair: S. Denetiere

6 - Mitigation of Voltage Drop Using Pre-insertion Resistors During Large Transformer Energization in a Weak System: Simulation and Field Verification

J. Hu, RBJ Engineering Corp, Canada

B. Bisewski, RBJ Engineering Corp, Canada

D. Maki, Minnesota Power, United States

M. Marz, American Transmission Company, United States

25 - Subsynchronous Oscillations in Series-Compensated Wind Farm -ATP Simulations and Countermeasure Detection

J. Ramamurthy, Michigan Technological University, USA

P. Mysore, Xcel Energy Inc, USA

B. Mork, Michigan Technological University, USA

40 - Limiting Sympathetic Interaction Between Transformers Caused by Inrush Transients

S. Schramm, General Electric - GE Global Research, Germany

C. Sihler, General Electric - GE Global Research, Germany

S. Rosado, General Electric - GE Global Research, Germany

211 - Simulating Thermal Conditions around Core Bolts when Transformer Experiencing Ferroresonance

C. A. Charalambous, University of Cyprus, Cyprus

R. Zhang, The University of Manchester, UK

Z. D. Wang, The University of Manchester, UK

121 - Calculation of inrush currents - benchmarking of transformer models

N. Chiesa, SINTEF, Norway

H. K. Høidalen, Norwegian University of Science and Technology, Norway

M. Lambert, EDF, France

M. M. Duro, EDF, France

13:20 – 15:00

Session 2A - Solution Methods and Modelling Techniques I

Chair: T. Noda

41 - Modeling of Overhead Transmission Lines with Large Asymmetrical Spans

L. Souza, Federal University of Rio de Janeiro, Brazil

A. Carlos Lima, Federal University of Rio de Janeiro, Brazil

S. Carneiro Jr., Federal University of Rio de Janeiro, Brazil

237 - Calculation of Underground Cables Frequency-Dependent Parameters Using Full-Wave Modal Analysis

S. Habib, University of Manitoba, Canada

B. Kordi, University of Manitoba, Canada

66 - Resonance and insertion studies with EMTP: working with large scale network

S. Denetiere, RTE, France

A. Parisot, RTE, France

E. Milin, RTE, France

A. D. Pons, Elia - Analysis Management, France

82 - Flexible Phase-Domain Synchronous Machine Model with Internal Fault for Protection Relay Testing and Related Real-Time Implementation Issues

P. Le-Huy, Hydro-Quebec's Research Institute, Canada
C. Larose, Hydro-Quebec's Research Institute, Canada
Frédéric Giguère, Hydro-Quebec Production, Canada

13:20 – 15:00

Session 2B - Transmission Lines and Cables I

Chair: A. Ramirez

139 - Finite Sections Modeling of Power Cable Systems

L. Colla, TERNA S.p.A., Italy
S. Lauria, University of Rome, La Sapienza, Italy
F. Palone, TERNA S.p.A., Italy

52 - Switching Restrikes in HVAC Cable Lines and Hybrid HVAC Cable/OHL Lines

F. Faria da Silva, Energinet.dk & Aalborg University, Denmark
C. Leth Bak, Aalborg University, Denmark
Per Balle Holst, Energinet.dk, Denmark

76 - Transient Analysis of a 150 kV Fault Current Limiting High Temperature Superconducting Cable

V. Mehairjan, Liandon, The Netherlands
M. Popov, Delft University of Technology, The Netherlands
A. A. Geschiere, Liandon, The Netherlands
W. L. Kling, Eindhoven University of Technology

96 - Transient Analysis on Second Arc Current and Recovery Voltage of UHV Series Compensated Transmission Line

Y. Zhang, China Electric Power Research Institute, China
L. Ban, China Electric Power Research Institute, China
Z. Xiang, China Electric Power Research Institute, China

B. Han, China Electric Power Research Institute, China
B. Zheng, China Electric Power Research Institute, China
W. Ma, China Electric Power Research Institute, China

106 - Analysis and Limiting Measures of Interphase Switching Surges on 1000kV Compact Transmission Lines

X. Wang, China Electric Power Research Institute, China
L. Ban, China Electric Power Research Institute, China
J. Lin, China Electric Power Research Institute, China
Z. Xiang, China Electric Power Research Institute, China

13:20 – 15:00

Session 2C - Very Fast Transients

Chair: R. Smeets

34 - A Wideband Strictly Passive Circuit Model of Power Transformer for the Very Fast Transient Simulation

Z. Zhang, North China Electric Power University, China
B. Yang, North China Electric Power University, China
L. Yang, North China Electric Power University, China

48 - Analysis of rate-of-rise of VFTO according to Switching Conditions in GIS

Hun-Chul Seo, Sungkyunkwan University, Korea
Won-Hyeok Jang, Sungkyunkwan University, Korea
Chul-Hwan Kim, Sungkyunkwan University, Korea
T. Funabashi, Meidensha Corporation, Japan
T. Senju, University of the Ryukyus, Japan

72 - Very Fast Transients in GIS: New approach towards analysis of the impact of the disconnector operation on the equipment

M. Szewczyk, ABB Corporate Research Center, Poland
M. Stosur, ABB Corporate Research Center, Poland
W. Piasecki, ABB Corporate Research Center, Poland
M. Ostrogórska, ABB Corporate Research Center, Poland
M. Fulczyk, ABB Corporate Research Center, Poland
M. Florkowski, ABB Corporate Research Center, Poland

M. Steiger, ABB Power Systems, Switzerland
J. Kostovic, ABB High Voltage Products, Switzerland

123 - Analysis of Very Fast Transient Overvoltage in a Proposed 275 kV Gas Insulated Substation
D. Tiong Aik Kho, Mott MacDonald Ltd, UK
K. Smith, Mott MacDonald Ltd, UK

185 - HF Resonators for Damping of VFTs in GIS
J. Smajic, ABB Switzerland Ltd., Corporate Research, Switzerland
W. Halaus, ABB Switzerland Ltd., Switzerland
A. Troeger, ABB Switzerland Ltd., Switzerland
S. Burrow, University of Stuttgart, Germany
R. Brandl, University of Stuttgart, Germany
S. Tenbohlen, University of Stuttgart, Germany

15:20 – 17:00

Session 3A - Real Time Digital Simulators and TNAs I

Chair: L. van der Sluis

84 - Real-Time Simulation of Three-Phase Transmission Lines Modeled in the Dynamic Harmonic Domain
J. de Jesus Chavez, Technological Institute of Morelia, Mexico
M. Madrigal, Center for Research and Advanced Studies of Mexico (CINVESTAV), Mexico
V. Dinavahi, University of Alberta, Canada

88 - Hardware in the loop optimization using Real Time Simulation Environment
In-Kwon Park, University of Manitoba, Canada
A. M. Gole, University of Manitoba, Canada
P. Forsyth, RTDS Technologies, Inc.
R. Kuffel, RTDS Technologies, Inc.

102 - Real-Time simulation of monitoring security in the Mexican Power System

C. A Lopez de Alba, University of Guadalajara, Mexico
V. Ortiz, University of Guadalajara, Mexico
L. A. Snider, University of Guadalajara, Mexico

133 - An FPGA-Based Hardware-in-the-Loop Simulator for Multilevel Converter Systems
M. Matar Bayoumi, University of Toronto, Canada
M. Saeedifard, Purdue University, USA
A. Etemadi, University of Toronto, Canada
R. Iravani, University of Toronto, Canada

148 - Real-Time Simulator Testing of an On-Line Integrated Stability Control System
R.P. Wierckx, RTDS Technologies Inc., Canada
M. Kawasaki, Chubu Electric Power Corp., Japan
N. Saito, Chubu Electric Power Corp., Japan
K. Anzai, Chubu Electric Power Corp., Japan
S. Verma, Chubu Electric Power Corp., Japan

15:20 – 17:00

Session 3B - Lightning Surges

Chair: C. Alberto Nucci

15 - Grounding Meshes Performance Evaluation in Sand Soil due Lightning Surges
D. S. Gazzana, Federal University of Rio Grande do Sul - UFRGS, Brazil
A. S. Bretas, Federal University of Rio Grande do Sul - UFRGS, Brazil
M. Telló, Pontifical Catholic University of Rio Grande do Sul - PUCRS, Brazil
G. A. D. Dias, Federal University of Rio Grande do Sul - UFRGS, Brazil
V. Dienstmann, Para-raios HINNDELET, Brazil

38 - Shielding Failure Current of Overhead Transmission Lines Generated through an ATPDraw Object
Z. G. Datsios, Aristotle University of Thessaloniki, Greece
P. N. Mikropoulos, Aristotle University of Thessaloniki, Greece

T. E. Tsovilis, Aristotle University of Thessaloniki, Greece

111 - Modeling of Telecommunication Cables Installed with Distribution Lines for Lightning Overvoltage Studies

K. Ishimoto, CRIEPI, Japan

T. Noda, CRIEPI, Japan

M. Nakamura, Chubu Electric Power Co., Inc., Japan

S. Maru, Chubu Electric Power Co., Inc., Japan

115 - Lightning Overvoltage Analysis of a 380-kV Gas-Insulated Line

M. Kizilcay, University of Siegen, Germany

C. Neumann, Amprion GmbH, Germany

15:20 – 17:00

Session 3C - Power System Dynamics and Control

Chair: V. Terzija

35 - Defining and Measuring Synchrophasors Based on Symmetry Principles

K. Seki, Mitsubishi Electric Corporation, Japan

46 - Quantitative evaluation of a mechanical simulator for power system stability

Y. Omagari, Osaka University, Japan

T. Funaki, Osaka University, Japan

55 - An Accurate Power Sharing Method for Control of a Multi-DG Microgrid

M. Hamzeh, Sharif University of Technology, Iran

H. Karimi, Sharif University of Technology, Iran

H. Mokhtari, Sharif University of Technology, Iran

M. Popov, Delft University of Technology, The Netherlands

202 - HVDC Connection of Offshore Wind Parks: VSC vs LCC with STATCOM

J. Jesus, IST - Technical University of Lisbon, Portugal

R. Castro, IST - Technical University of Lisbon, Portugal

J. M. Ferreira de Jesus, IST - Technical University of Lisbon, Portugal

247 - Improvement of Power System Transient Stability Using a Controllable Resistor Type Fault Current

M. T. Hagh, University of Tabriz, Iran

S. B. Naderi, University of Tabriz, Iran

M. Jafari, University of Tabriz, Iran

Wednesday, 15 June

9:20 – 11:00

Session 4A - Real Time Digital Simulators and TNAs II

Chair: R. Iravani

163 - Floating-Point Engines for the FPGA-Based Real-Time Simulation of Power Electronic Circuits

T. Ould Bachir, École Polytechnique de Montréal, Canada

C. Dufour, Opal-RT Technologies Inc., Canada

Jean-Pierre David, École Polytechnique de Montréal, Canada

J. Mahseredjian, École Polytechnique de Montréal, Canada

194 - Real Time Simulation of Power System and HIL Testing of STATCOM Based Inter-area Oscillation Damping Controller

G. Maya, National Institute of Technology, Calicut, India

E. P. Cheriyan, National Institute of Technology, Calicut, India

J. Jacob, National Institute of Technology, Calicut, India

244 - Multi-Processor Cholesky Decomposition of Conductance Matrices

T. Maguire, RTDS Technologies Inc., Canada

248 - Real-Time Simulation of Modular Multilevel Converters for Network Integration Studies

P. Le-Huy, Hydro Quebec's Research Institute, Canada

P. Giroux, Hydro Quebec's Research Institute, Canada

J.-C. Soumagne, Hydro Quebec's Research Institute, Canada

159 - Validation of a 60-Level Modular Multilevel Converter Model - Overview of Offline and Real-Time HIL Testing and Results

Luc-André Grégoire, Opal-RT Technologies Inc., Canada
W. Li, Opal-RT Technologies Inc., Canada
J. Bélanger, Opal-RT Technologies Inc., Canada
L. Snider, University of Guadalajara, Mexico

9:20 – 11:00

Session 4B - System Protection and Fault Location II

Chair: M. M. Saha

80 - Fault Location in Extra Long HVdc Transmission Lines using Continuous Wavelet Transform

K. Nanayakkara, University of Manitoba, Canada
A. Rajapakse, University of Manitoba, Canada
R. Wachal, Manitoba HVDC Research Center, Canada

92 - Transmission System Fault Location Using Limited Number of Synchronized Recorders

M. Korkali, Northeastern University, USA
A. Abur, Northeastern University, USA

100 - Wavelet Based Transient Directional Method for Busbar Protection

N. Perera, University of Manitoba, Canada
A. D. Rajapakse, University of Manitoba, Canada
D. Muthumuni, Manitoba HVDC Research Center, Canada

120 - A New Non-Communication Protection Scheme Employing Multi-resolution Gradient for Three-Terminal Lines

M. Khodadadi, Iran University of Science and Technology (IUST), Iran
S. M. Shahrtash, Iran University of Science and Technology (IUST), Iran

125 - Optimal coordination of mixed scheme protection using Genetic Algorithm

F. C. Souza Júnior, Federal University of Campina Grande, Brazil
B. A. de Souza, Federal University of Campina Grande, Brazil

9:20 – 11:00

Session 4C - Transformers and Rotating Machines

Chair: F. Moreira

7 - A Novel Technique to Detect AC Machine Turn Insulation Failure Subjected to Steep Front Impulse Waveform

A. El-Hag, American University of Sharjah, United Arab Emirates
A. Gaouda, Emirates University, United Arab Emirates
S. Jayaram, University of Waterloo, Canada
S. Ul-Haaq, University of Waterloo, Canada

47 - Testing a Virtual Synchronous Generator in a Real Time Simulated Power System

V. Karapanos, Delft University of Technology, The Netherlands
S. de Haan, Delft University of Technology, The Netherlands
K. Zwetsloot, Delft University of Technology, The Netherlands

91 - Transformer Internal Fault Modeling in ATP

A. Avendano, Michigan Technological University, USA
B. Mork, Michigan Technological University, USA
H. K. Høidalen, Norwegian University of Science and Technology, Norway

224 - The Influence of a Cable on the Voltage Distribution in Transformer Windings

G. Hoogendorp, Delft University of Technology, The Netherlands
M. Popov, Delft University of Technology, The Netherlands
L. van der Sluis, Delft University of Technology, The Netherlands

122 - Developments in the Hybrid Transformer Model - Core Modeling and Optimization

H. K. Høidalen, Norwegian University of Science and Technology, Norway

N. Chiesa, SINTEF, Norway

A. Avendaño, Michigan Technological Institute, USA

B. Mork, Michigan Technological Institute, USA

P. Balcerek, ABB Corporate Research, Krakow, Poland

M. Orkisz, ABB Corporate Research, Krakow, Poland

241 - Mitigation Methods of magnetizing inrush transient during energization of large power transformer

M. Askoura, Al-Azhar University, Egypt

A. El-Baz, Saudi Electricity Company, Saudi Arabia

11:20 – 13:00

Session 5A - Inrush Currents, Ferroresonance and SSR II

Chair: H. K. Høidalen

141 - Modeling and electromagnetic transients study of two 1800MVA phase shifting transformers in the Italian transmission network

L. Colla, TERNA S.p.A., Italy

V. Luliani, TERNA S.p.A., Italy

F. Palone, TERNA S.p.A., Italy

M. Rebolini, TERNA S.p.A., Italy

S. Zunino, TERNA S.p.A., Italy

11:20 – 13:00

Session 5B - Transmission Lines and Cables II

Chair: A. Ametani

193 - Improving Numerical Performance of Transmission Line Models in EMTP

J. Luis Naredo, CINVESTAV-Guadalajara Unit, Mexico

J. Mahseredjian, École Polytechnique de Montréal, Canada

J. A. Gutierrez-Robles, Universidad de Guadalajara, Mexico

O. Ramos-Leaños, École Polytechnique de Montréal, Canada

C. Dufour, Opal-RT Technologies Inc., Canada

J. Bélanger, Opal-RT Technologies Inc., Canada

136 - Assessing P28 Guidelines for Renewable Generation Connections

R. Turner, Mott MacDonald Ltd, UK

K. Smith, Mott MacDonald Ltd, UK

157 - Lightning performance analysis aimed at evaluating changes in the insulator strings of the 500 kV transmission line affected by extreme winds

G. R. Calzolari, UTE, Uruguay

C. R. Saldaña, UTE, Uruguay

212 - Statistical Analysis of Ferroresonance in a 400 kV Double-Circuit Transmission System

R. Zhang, The University of Manchester, UK

J. S. Peng, The University of Manchester, UK

S. P. Ang, The University of Manchester, UK

H. Y. Li, The University of Manchester, UK

Z. D. Wang, The University of Manchester, UK

P. Jarman, National Grid, UK

176 - Transient Performance Analysis on Overhead Transmission Line Considering the Frequency Dependent Soil Representation

J. B. Gertrudes, University of Campinas, Brazil

M. C. Tavares, University of Campinas, Brazil

C. Portela, Federal University of Rio de Janeiro, Brazil

54 - New method for subsynchronous resonance detection

M. Orman, ABB Corporate Research, Krakow, Poland

182 - Investigation of Submarine Cable Parameters Impact on Energization Transients in Offshore Wind Farms

E. A. Badran, Mansoura University, Egypt

M. E. M. Rizk, Mansoura University, Egypt
M. H. Abdel-Rahman, Mansoura University, Egypt

200 - Aspects Related to Replacing HV Lines by HV Cables on Resonant Grid Behavior

L. Wu, Eindhoven University of Technology, The Netherlands
P. Wouters, Eindhoven University of Technology, The Netherlands
F. Steennis, Eindhoven University of Technology, The Netherlands

11:20 – 13:00

Session 5C - Solution Methods and Modeling Techniques II

Chair: S. Carneiro

90 - Accurate Electro-magnetic Transient Modelling of Sector-shaped Cables

K.K. M. Anuradha Kariyawasam, University of Manitoba, Canada
A. M. Gole, University of Manitoba, Canada
B. Kordi, University of Manitoba, Canada
H. M. J. S. P. De Silva, Manitoba HVDC Research Centre, Canada

78 - A New Method for the Inclusion of Frequency Domain Responses in Time Domain Codes

K. Sheshyekani, Arak university, Iran
H. Reza Karami, Amirkabir University of Tech, Iran
A. Dehkhoda, Amirkabir University of Tech, Iran
F. Rachidi, Swiss Federal Institute of Technology, Switzerland
R. Kazemi, Amirkabir University of Tech, Iran
S. H. H. Sadeghi, Amirkabir University of Tech, Iran
R. Moini, Amirkabir University of Tech, Iran

240 - A New Elongation Function for Modelling Long Arcs in Free Air

G. Preston, The University of Manchester, UK
M. Popov, Delft University of Technology, The Netherlands

Z. Radojevic, The University of Belgrade, Serbia
V. Terzija, The University of Manchester, UK

112 - Identification of network models parameters for simulating transients

D. Cavallera, EDF-DTG, France
Jean-Louis Coulomb, G2ELAB, France
O. Chadebec, G2ELAB, France
B. Caillault, EDF-DTG, France
F. Xavier Zgainski, EDF-DTG, France
A. Ayroulet, G2ELAB, France

233 - Interfacing Methods for Combined Stability and Electromagnetic Transient Simulations applied to VSC-HVDC

A. A. van der Meer, Delft University of Technology, The Netherlands
R. L. Hendriks, Delft University of Technology, The Netherlands
M. Gibescu, Delft University of Technology, The Netherlands
W. L. Kling, Delft University of Technology, The Netherlands

14:20 – 16:00

Session 6A - Switching and Fault Transients II

Chair: I. Ugljesic

21 - Parametric Analysis of Three-Phase Autoreclosing Method for Compensated Transmission Lines

P. Mestas, University of Campinas, Brazil
M. C. Tavares, University of Campinas, Brazil
A. M. Gole, University of Manitoba, Canada

26 - Current Chopping Analysis in Small Inductive Current Switching

M. M. Meraat, Frab Co., Iran
M. A. Atefi, University of Tehran, Iran
A. Gholami, Iranian University of Science and Technology, Iran

31 - A New Online Over-voltage Monitoring Method Based on the Numerical Inverse Laplace Transform

Z. Zhang, North China Electric Power University, China
S. Tang, North China Electric Power University, China
Z. Wang, North China Electric Power University, China
X. Wang, North China Electric Power University, China

103 - The Impact of the Distribution Network Type and Configuration on the Transient Behavior of the Fault and Neutral Points during Earth Faults

M. Abdel-Fattah, Aalto University, Finland
M. Lehtonen, Aalto University, Finland
R. J. Millar, Aalto University, Finland
C. J. Kim, Howard University, USA

220 - Real Time Implementation of Transmission Line Controlled Switching

K. M. C. Dantas, Federal University of Campina Grande, Brazil
W. L. A. Neves, Federal University of Campina Grande, Brazil
D. Fernandes Jr., Federal University of Campina Grande, Brazil
G. A. Cardoso, Federal University of Campina Grande, Brazil
L. C. Fonseca, Companhia Hidro Elétrica do São Francisco, Brazil

14:20 – 16:00

Session 6B - Power Electronics and FACTS

Chair: J. Mahseredjian

137 - Short circuit and induced voltage transient study on a planned 1000MW HVDC-VSC link

L. Colla, TERNA S.p.A., Italy
S. Lauria, University of Rome, La Sapienza, Italy
F. Palone, TERNA S.p.A., Italy

192 - An Adaptive Supplementary Controller for a UPFC
U. Malhotra, University of Saskatchewan, Canada

R. Gokaraju, University of Saskatchewan, Canada
D. Muthumuni, Manitoba HVDC Research Centre, Canada

144 - Loss Estimation of Modular Multi-Level Converters using Electro-Magnetic Transients Simulation

U.N. Gnanarathna, University of Manitoba, Canada
A. M. Gole, University of Manitoba, Canada
A. D. Rajapakse, University of Manitoba, Canada
S. K. Chaudhary, Aalborg University, Denmark

219 - Evaluation of Performance of FACTS based Phase Imbalance Schemes for Damping Torsional Oscillations and Power Swings

M. C. Chudasama, Indian Institute of Technology, Bombay, India
S. R. Joshi, Government Engineering College, Surat, India
A. M. Kulkarni, Indian Institute of Technology, Bombay, India

14:20 – 16:00

Session 6C - Simulation Tools

Chair: A. Gole

39 - Impulse Resistance of Concentrated Tower Grounding Systems Simulated by an ATPDraw Object

Z. G. Datsios, Aristotle University of Thessaloniki, Greece
P. N. Mikropoulos, Aristotle University of Thessaloniki, Greece
T. E. Tsovilis, Aristotle University of Thessaloniki, Greece

61 - Design Studies for a Wind Farm Collector System

J. Zheng Zhou, Teshmont Consultants LP, Canada
R. S. Burton, Teshmont Consultants LP, Canada

77 - Impact of high voltage shunt capacitor banks on general purpose circuit breaker

M. Alawie, Hydro-Quebec, Canada
Y. Filion, Hydro-Quebec, Canada
A. Coutu, Hydro-Quebec, Canada

129 - Evaluation of the risk of failure due to switching over-voltages of a phase to phase insulation

A. Xemard, EDF R&D, France

J. Michaud, EDF R&D, France

A. Guerrier, RTE, France

I. Ugljesic, Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia

G. Levacic, Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia

M. Mesic, HEP, Croatia

227 - A Comparative Analysis of Transformer Models Available in the ATP Program for the Simulation of Ferroresonance

L. B. Viena, Federal Institute of Technological Education of Bahia, Brazil

F. A. Moreira, Federal University of Bahia, Brazil

N. R. Ferreira, Federal University of Bahia, Brazil

N. C. de Jesus, GSI Engenharia e Consultoria Ltda., Brazil

Thursday, 16 June

9:20 – 11:00

Session 7A - Switching and Fault Transients III

Chair: M. C. Tavares

20 - Investigation on the Occurrence of Delayed Current Zeros Phenomena in Power Stations and Relating Stress Imposed on Generator Circuit-Breakers

M. Palazzo, ABB Switzerland Ltd., Switzerland

D. Bruin, ABB Switzerland Ltd., Switzerland

M. Delfanti, Politecnico di Milano University, Italy

127 - Fast Locating of a Switched Capacitor in a Power System using a Slope-based Method

A. Saadatpoor, University of Toronto, Canada

A. Tabesh, Isfahan University of Technology, Iran

R. Irvani, University of Toronto, Canada

128 - Requirements for switching algorithms of EHV shunt compensated OHL by SF6-circuit breakers

V. E. Kachesov, RPC “ENERGOCONSULT” Limited, Russian Federation

D. V. Kachesov, RPC “ENERGOCONSULT” Limited, Russian Federation

155 - Transient Recovery Voltages in Vacuum Circuit Breakers Generated by the Interruption of Inrush Current of Large Motors

A. Borghetti, University of Bologna, Italy

F. Napolitano, University of Bologna, Italy

C. Alberto Nucci, University of Bologna, Italy

M. Paolone, University of Bologna, Italy

M. Sultan, Saudi Aramco, Saudi Arabia

N. Tripaldi, Saipem S.p.A., Italy

162 - Realization of Transient Recovery Voltages for Ultra High Voltage Circuit Breakers in Testing

R. Smeets, Kema TDT, The Netherlands

S. Kuivenhoven, Kema TDT, The Netherlands

A.B. Hofstee, Kema TDT, The Netherlands

9:20 – 11:00

Session 7B - System Protection and Fault Location III

Chair: C. H. Kim

161 - Aspects of Phasor Angle Measurement for Wind Farm Protection Applications

N. El-Kalashy, Electrical Eng. Dept., Faculty of Engineering, Minoufiya University, Egypt

T. Kawady, Electrical Eng. Dept., Faculty of Engineering, Minoufiya University, Egypt

N. Mansour, Electrical Eng. Dept., Faculty of Engineering, Minoufiya University, Egypt

196 - Influence of Distributed Generation on protection schemes of medium voltage grids
N. Hong Viet Phuong, Delft University of Technology, The Netherlands
I. Xyngi, Delft University of Technology, The Netherlands
M. Popov, Delft University of Technology, The Netherlands
L. van der Sluis, Delft University of Technology, The Netherlands

210 - Fault-Induced Transient Analysis for Real-Time Fault Detection and Location in Transmission Lines
F. B. Costa, Federal University of Rio Grande do Norte, Brazil
B. A. Souza, Federal University of Campina Grande, Brazil

225 - Phasor Estimation Using a Modified Sine Filter Combined with an Adaptive Mimic Filter
K. M. Silva, University of Brasilia, Brazil
B. F. Küsel, University of Brasilia, Brazil

242 - Short Circuit Arc and the Performance of Distance Protection in 150 kV System
H. Wihartady, PT PLN (Persero), Indonesia
M. Popov, Delft University of Technology, The Netherlands
L. van der Sluis, Delft University of Technology, The Netherlands

9:20 – 11:00

Session 7C - Solution Methods and Modeling Techniques III

Chair: A. Abur

158 - Simulation of power system transients using state-space grouping through nodal analysis
J. Mahseredjian, École Polytechnique de Montréal, Canada
C. Dufour, Opal-RT Technologies Inc., Canada
U. Karaagac, École Polytechnique de Montréal, Canada
J. Bélanger, Opal-RT Technologies Inc., Canada

165 - Comparisons of Impact on the Modeling Detail on Real

Time Simulation of Large Power Systems with HVDC
Y. Liang, University of Manitoba, Canada
X. Lin, University of Manitoba, Canada
A. M. Gole, University of Manitoba, Canada
M. Yu, RTDS Technologies Inc., Canada
Y. Zhang, Tsinghua University, China
B. Zhang, Tsinghua University, China

184 - An Investigation on Interpolation Methods Applied in Transmission Line Models for EMT Analysis
J. Alberto Gutiérrez-Robles, University of Guadalajara, Mexico
L. A. Snider, University of Guadalajara, Mexico
J. Luis Naredo, CINVESTAV-Guadalajara Unit, Mexico
O. Ramos-Leaños, École Polytechnique de Montréal, Canada

99 - A Practical Steady-State Initialization Method for Electromagnetic Transient Simulations
T. Noda, CRIEPI, Japan
K. Takenaka, CRIEPI, Japan

4 - Experimental and FDTD Investigation of Surge Propagation Characteristics on Steel Frames and Concrete Walls in a Building
S. Irie, Doshisha University, Japan
A. Ametani, Doshisha University, Japan
N. Nagaoka, Doshisha University, Japan
Y. Baba, Doshisha University, Japan

Friday, 17 June

9:20 – 11:00

Session 8A - Transmission Lines and Cables III

Chair: M. Kizilcay

199 - On-Line Emergency Measure for HV Power Cables based on Estimation of Remained Insulation Thickness (RIT)
M. Bakhshi Ashtiani, Iran University of Science and Technology, Iran

S. M. Shahrtash, Iran University of Science and Technology,
Iran

215 - Single-Phase Auto-Recloser Studies: Influence of
Transversal Parameters of a Transmission System on the
Secondary Arc Current Reduction during SPAR
M. E. Zevallos, University of Campinas, Brazil
M. C. Tavares, University of Campinas, Brazil

218 - Switching studies for the Horns Rev 2 wind farm
C. F. Jensen, Energinet.dk & Aalborg University, Denmark
F. Faria da Silva, Energinet.dk & Aalborg University,
Denmark
C. L. Bak, Aalborg University, Denmark
W. Wiechowski, WTW Power Solutions, Poland

229 - Current and Voltage Harmonic Content of Artificially
Generated Electrical Arc in Out-Door Experiment
M. C. Tavares, University of Campinas, Brazil
J. L. Talaisys, University of Campinas, Brazil
C. Portela, Universidade Federal do Rio de Janeiro, Brazil
A. B. Câmara, FURNAS Centrais Elétricas S.A., Brazil

245 - Derivation of Theoretical Formulas of Sequence Currents
on Underground Cable Systems
T. Ohno, Tokyo Electric Power Company, Japan
A. Ametani, Doshisha University, Japan
C. L. Bak, Aalborg University, Denmark

9:20 – 11:00

Session 8B - Distributed Generation

Chair: M. Paolone

53 - Control of a Stand-alone Distributed Generation System
Comprising PV-array, Hydrogen Unit and Battery Storage
M. Shirazi, Sharif University of Technology, Iran
M. R. Zolghadri, Sharif University of Technology, Iran
H. Karimi, Sharif University of Technology, Iran

M. Popov, Delft University of Technology, The Netherlands

68 - Transient Analysis of Variable-Speed Wind Turbines
during a Converter Control Malfunction
R. Melício, Center for Innovation in Electrical and Energy
Engineering, IST, Lisbon, Portugal
V. M. F. Mendes, Instituto Superior de Engenharia de Lisboa,
Lisbon, Portugal
J. P. S. Catalão, University of Beira Interior, Covilha, Portugal

113 - Fault current contribution from state of the art DG's and
its limitation
A. Janssen, Liander, The Netherlands
M. van Riet, Liandon, The Netherlands
J. Bozelie, Liandon, The Netherlands
J. Au-yeung, Liander, The Netherlands

108 - Transient Directional Relay at Interconnection of Remote
Distributed Generations to Distribution Network
N. Mahmoudpour, Iran University of Science and Technology
(IUST), Iran
S. Jamali, Iran University of Science and Technology (IUST),
Iran
S. M. Shahrtash, Iran University of Science and Technology
(IUST), Iran

109 - A Novel Method of Fault Detection and Direction
Identification in Presence of Remote Distributed Generators
N. Mahmoudpour, Iran University of Science and Technology,
Iran
S. Jamali, Iran University of Science and Technology, Iran
S. M. Shahrtash, Iran University of Science and Technology,
Iran

11:20 – 13:00

Session 9A - Switching and Fault Transients IV

Chair: A. Xemard

64 - CO2 Circuit Breaker Arc Model for EMTP Simulation of

SLF Interrupting Performance

K. Udagawa, Toshiba Corporation, Japan
T. Koshizuka, Toshiba Corporation, Japan
T. Uchii, Toshiba Corporation, Japan
T. Shinkai, Toshiba Corporation, Japan
H. Kawano, Toshiba Corporation, Japan

188 - Static and Dynamic Calculation of Short-Circuit Currents in Synchronous Generators

T. A. Papadopoulos, Aristotle University of Thessaloniki, Greece
Ch. G. Kaloudas, Aristotle University of Thessaloniki, Greece
P. N. Papadopoulos, Aristotle University of Thessaloniki, Greece
A. G. Marinopoulos, ABB Corporate Research, Västerås, Sweden
G. K. Papagiannis, Aristotle University of Thessaloniki, Greece

221 - Switching transients in offshore wind farms – impact on the offshore and onshore networks

R. King, Cardiff University, UK
F. Moore, Cardiff University, UK
N. Jenkins, Cardiff University, UK
M. Haddad, Cardiff University, UK
H. Griffiths, National Grid, UK
M. Osborne, National Grid, UK

230 - Estimation of Length Variation of Artificially Generated Electrical Arc in Out-Door Experiment

J. L. Talaisys, University of Campinas, Brazil
M. C. Tavares, University of Campinas, Brazil
C. Portela, Universidade Federal do Rio de Janeiro, Brazil
A. Câmara, FURNAS Centrais Elétricas S.A., Brazil

246 - New Series Resonance Type Fault Current Limiter

M. T. Hagh, University of Tabriz, Iran
M. Jafari, University of Tabriz, Iran
S. Naderi, University of Tabriz, Iran

11:20 – 13:00

Session 9B - Harmonics and Power Quality

Chair: M. T. Correia de Barros

50 - Dynamic control of electrolyser for voltage quality enhancement

N. Chiesa, SINTEF Energy Research, Norway
M. Korpås, SINTEF Energy Research, Norway
O. E. Kongstein, SINTEF Materials and Chemistry, Norway
A. Ødegård, SINTEF Materials and Chemistry, Norway

83 - Interharmonic Analysis via Thevenin Iterations

M. Caixba, Center for Research and Advanced Studies of Mexico (CINVESTAV), Mexico
A. Ramirez, Center for Research and Advanced Studies of Mexico (CINVESTAV), Mexico

118 - Impact of Waveform Segmentation Accuracy on Disturbance Recognition Reliability

M. Caujolle, EDF R&D, France
M. Petit, E3S – SUPELEC Systems Sciences, France
G. Fleury, E3S – SUPELEC Systems Sciences, France
L. Berthet, EDF R&D, France

164 - New Deviation Factor of Power Quality using Tensor Analysis and Wavelet Packet Transform

A. J. Ustariz, Universidad Nacional de Colombia, Columbia
E. A. C. Plata, Universidad Nacional de Colombia, Columbia
H. E. Tacca, Universidad de Buenos Aires, Argentina

89 - Transient Simulation Technique for HVDC Systems

Y. Cho, Georgia University of Technology, USA
G. Cokkinides, Georgia University of Technology, USA
A. P. Meliopoulos, Georgia University of Technology, USA

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