17th [2016]
International Conference on
HARMONICS AND QUALITY OF POWER

Belo Horizonte, Minas Gerais State, Brazil

ICHQP

IEEE PES ICHQP 2016 - October, 16 to 19 - 2016

IEEE PES

Power & Energy Society®

Welcome from the Conference Chairs

On behalf of the Organizing Committee of the 17th International Conference on Harmonics and Quality of Power (ICHQP 2016) we welcome all delegates and visitors to Belo Horizonte. The International Conference on Harmonics and Quality of Power is one of the premier international conferences in the field and aims to provide a forum for electrical engineers and scientists to present their work and share information in this area of growing interest and importance in the Electric Power Industry around the world.

We sincerely thank the Steering Committee of the ICHQP for the encouragement and support provided over the last few years to hold this conference in Brazil for the second time and feel very honored by the recognition they have demonstrated towards our activities. Our sincere gratitude is offered to the members of the Technical Review Committee who have worked tirelessly to review the papers. We sincerely thank the Federal Universities of Itajubá, of Uberlandia, of Minas Gerais and of Catholic University for the support provided for the preparation, organization and logistics for the Conference. We also wish to thank the Organizing Committee for their efforts in the numerous tasks always required for such an event. We are sure that they will continue to do their best during your stay to render it a pleasant memory. The sponsorships provided by CEMIG, Eletronorte, GE, COPEL, CNPq, CAPES and FAPEMIG are greatly appreciated. Sincere thanks to all Authors that made this conference possible by means of their participation and papers.

This conference happens in the context of an industrial revolution called "Smart Grids" which brings new challenges and opportunities for all involved in the development of sustainable electrical energy networks in which new technologies and models for the industry are being developed and tested. Let us keep in mind that no model of the electric grid is complete, and none is a mere fantasy.... Each is a serious attempt to provide the best system at a given period, and each succeeds in producing workable solutions, but also each reflects the prevalent psychology, economics, politics, etc. of an age almost as much as it reflects the state of that age's technological knowledge.

We hope you will find the conference stimulating and enjoyable, have a memorable time in Belo Horizonte, Brazil and have the opportunity to renew old friendships and make new ones.

Prof. Paulo F. Ribeiro and Prof. José Policarpo

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ICHQP 2016 Local Organizing Committee

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Maria Emilia de Lima Tostes, Brazil
Mark Halpin, USA

Math Bollen, Sweden
Miguel Pires de Carli, Brazil
Mihai Popescu (Romania)
Morris Brenna (Italy)
Nelson Kagan, Brazil
Neville Watson, New Zealand
Nicolae Golovanov (Romania)
Nubia Silva Dantas Brito, Brazil
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Walmir de Freitas Filho, Brazil
Washington Neves, Brazil
Wilsun Xu, Canada
Yahia Baghzouz, USA

Power & Energy Society®

General Information

Conference Venue

OURO MINAS PALACE HOTEL
Av. Cristiano machado, 4001 | Belo Horizonte - MG - Brazil | CEP: 31910-810 | +55 (31) 3429-4001

Registration and Information Desks

- Sunday 16th October – Reception Desk, 12:00 – 18:00
- Monday 17th October – Reception Desk, 08:30 – 18:00
- Tuesday 18th October – Reception Desk, 08:00 – 13:00
- Wednesday 19th October – Reception Desk, 08:00 – 13:00

Delegates and accompanying persons will be issued with name badges which must be worn during the conference and social events. Entrance to various conference sessions and activities will be strictly through registration only.

Smoking Policy

According to the Brazilian law it is not allowed any smoking inside the buildings.

Morning & Afternoon Coffee Break

Morning and afternoon coffee break will be provided in the Foyer Centenário.

Lunch

For participants of the event, the hotel will make a discounted price.

Internet Access

Internet point will be available near the conference registration and information desk.

Social Events

Welcome Reception – will be held at the Ouro Minas Hotel on Sunday 16th at 19:30 followed by a short video presentation by Prof. Alex Emanuel and ICHQP History by Dario Zaninelli.
Conference dinner –will be held on Tuesday 18th October at 20:00 at the Ouro Minas Hotel.
Conference tour – the conference tour is scheduled for the morning of Wednesday 19th of October. The conference tour consists in a guided visit to the Inhotim Institute - Buses will depart at 8:15AM.
Inhotim Contemporary Art
Instituto Inhotim is home to a museological complex featuring a series of pavilions and galleries with works of art and sculptures on display in the open air. Since the outset, Inhotim's rise on the scene of the Brazilian cultural institutions has been marked by the mission to create an artistic collection and to define new museological strategies that provide the community with access to cultural assets. In this sense, it seeks to bring the public into contact with a relevant set of artworks, produced by artists from different parts of the world, providing an up-to-date reflection on the questions of contemporaneity. Inhotim is the only Brazilian Institute institution with a world-class collection of contemporary art continuously on display.
Accompanying Persons Tour – different tours can be organized on demand at the Secretariat desk.

Guidelines for Authors and Presenters

The oral presentations at ICHQP2016 have to be prepared and delivered in English. Presentations should be of 'PowerPoint' style for delivery via data projector. Computer and projection facilities will be available at the conference venue.

Presenters will be required to provide their presentations (CD or USB drive format) to the conference support staff located into the conference rooms no later than 30 minutes before the session starting.

Each paper presentation will be no more than 16 minutes in duration consisting of 12 minutes speaking time followed by 4 minutes of question time. Session Chairs will strictly enforce presentation duration.

The poster should be in maximum A0 (84 cm x 120 cm) format and only vertically oriented. No specific guidelines are provided for preparation of the poster. At least one author per paper must be present during the poster session. Posters have to be placed in the reserved space before the session starting and removed after the session. Otherwise posters will be disposed of by organizers. In the Poster Area authors will find everything they need to fix poster on its location.

Plenary Sessions Keynote Topics

Four keynote addresses are scheduled for delivery on Monday 17th and Tuesday 18th.

- Plenary Session Keynote Speaker 1 (Monday - 10:30-11:30)

Mark MacGranahan - Power Quality Issues for the Integrated Grid.

- Plenary Session Keynote Speaker 2 (Monday - 11:30-12:30)

Alex McEachern - "Predicting Cyber Attacks on the Grid, using Power Quality Measurements"
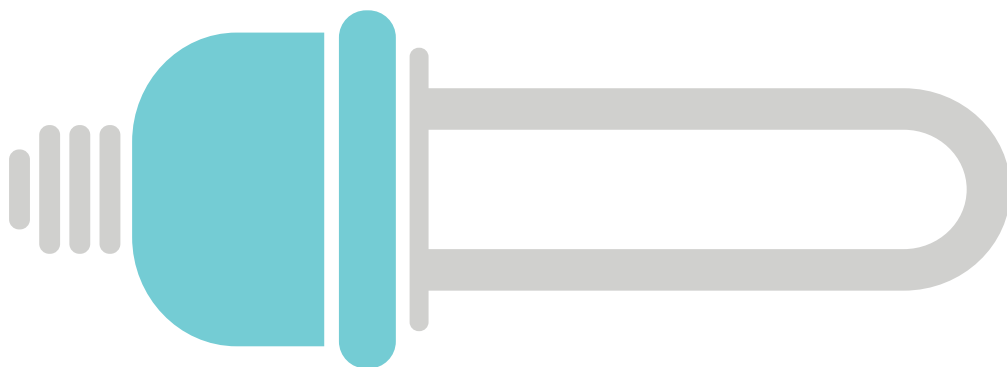
- Plenary Session Keynote Speaker 3 (Tuesday 13:30-14:30)

Math Bollen - "Supraharmonics - Hype or new phenomenon?"

- Plenary Session Keynote Speaker 4 (Tuesday 14:30-15:30):

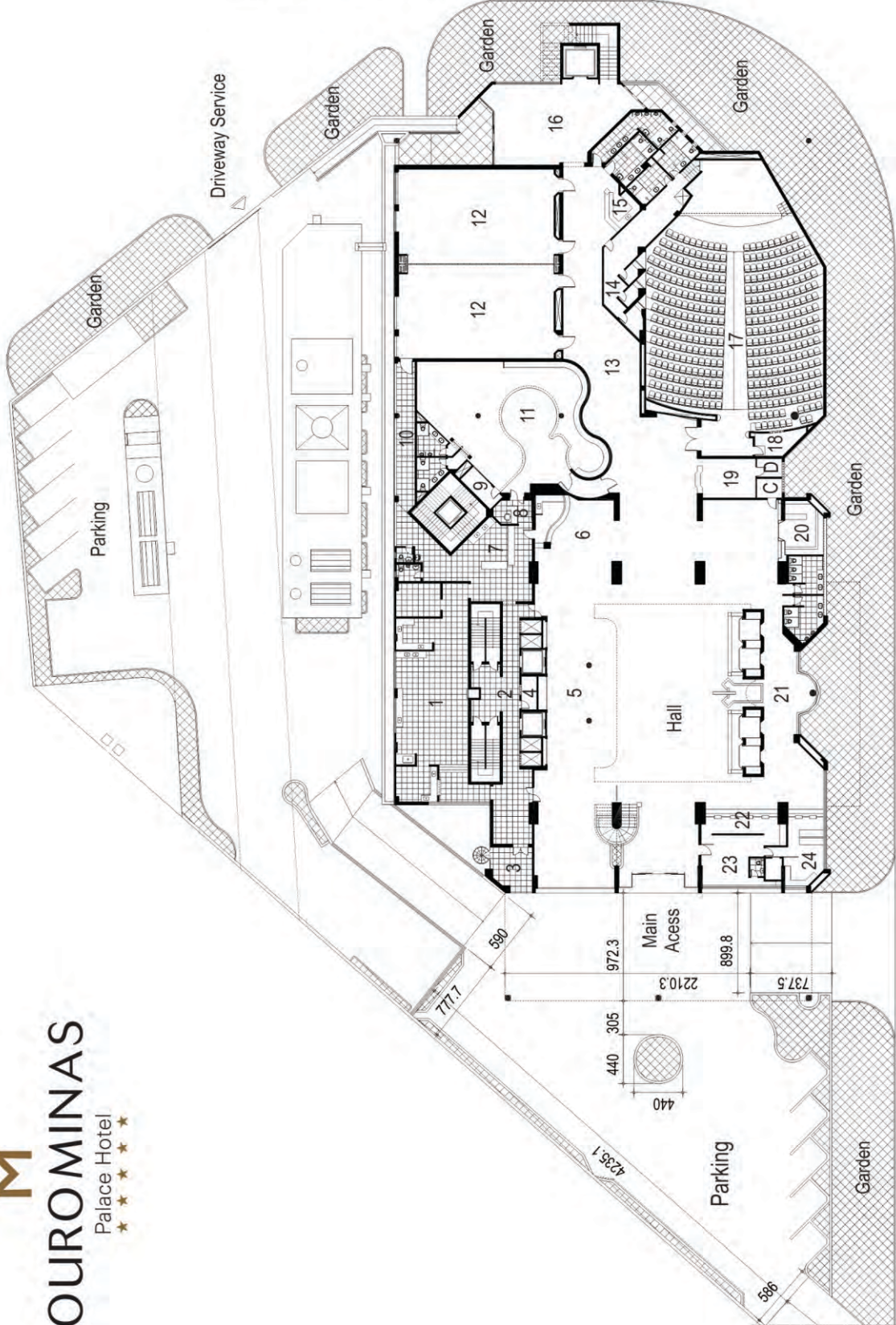**Jovica Milanovic** - "Monitoring Power Quality"

Exhibition Area

A number of organizations are exhibiting power quality related technologies at ICHQP 2016. The exhibition area is located at the Centenário 3.
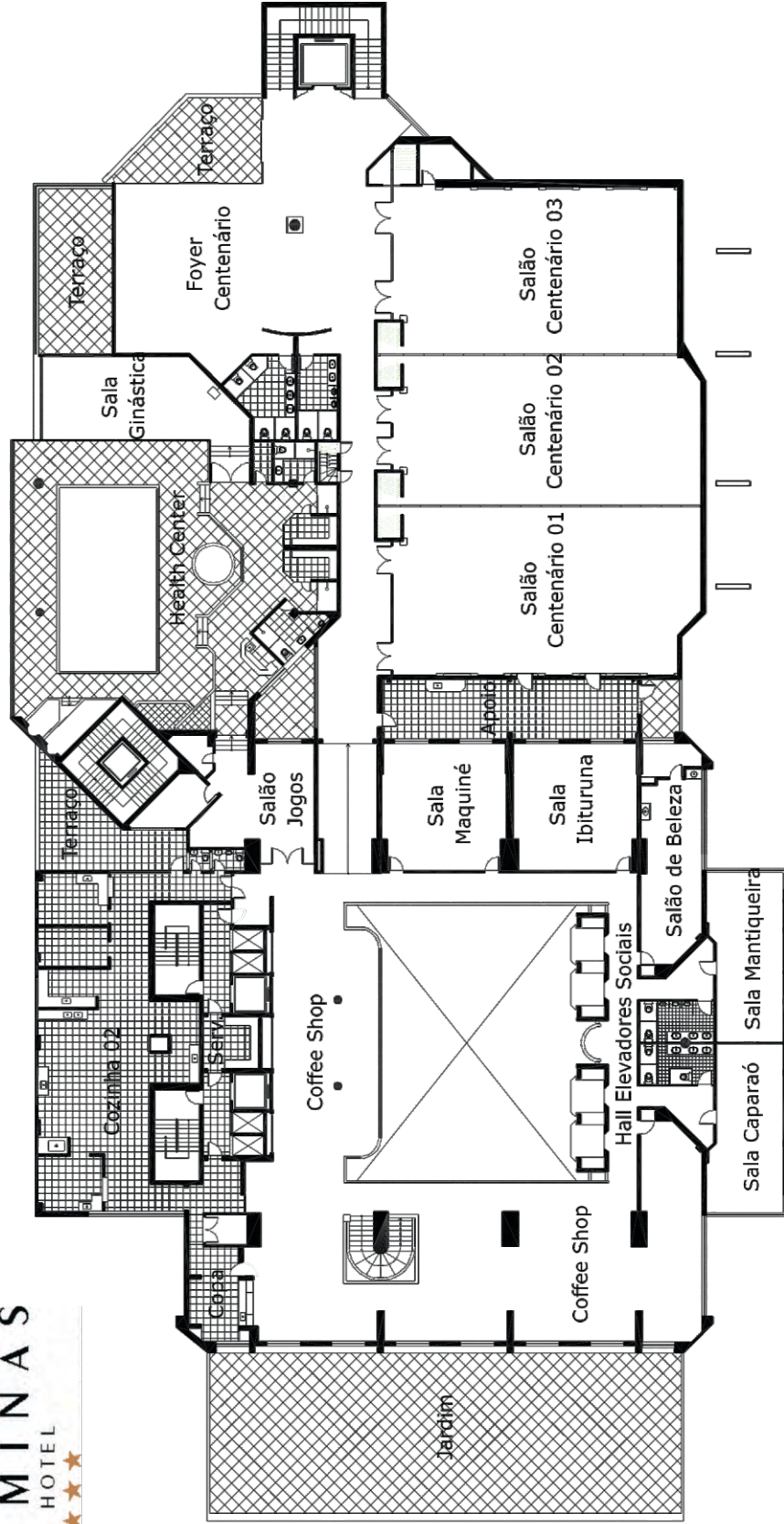
Contact number in case of difficulties

In case of difficulties, delegates may call **+55 (35) 98876-4806 (Prof. Paulo F. Ribeiro)**

OURO MINAS
Palace Hotel ★★★★

LEGEND:
1-Kitchen 01
2-Service
3-Emergency Exit
4-Luggage
5-Restaruant
6-Lobby Piano Bar
7-Pantry/Beverages
8-Cash register
9-Sound Booth
10-Service
11-Niemeyer Room
12-Tiradentes Ballroom
13-Hall Conference
14-Cabins for Simultaneous Translation
15-Coffee Break Support
16-Foyer Tiradentes
17-Ouro Preto Auditorium
18-Audio-Video Cabin
19-Event Secretariat
20-Gift Shop
21-Hall Social Elevator
22-Reception
23-Guest Service
24-Cash Register

D-Warehouse
C-Powerhouse

Garden
Garden
Garden
Garden
Garden
Garden

Driveway Service

Parking

Parking

Main Acess

Hall

OURO MINAS
PALACE HOTEL

Terraço

Terraço

Foyer Centenário

Sala Ginástica

Salão Centenário 03

Health Center

Salão Centenário 02

Salão Centenário 01

Terraço

Salão Jogos

Apoio

Sala Maquiné

Sala Ibituruna

Salão de Beleza

Cozinha 02

Serv.

Coffee Shop

Hall Elevadores Sociais

Coffee Shop

Sala Caparaó

Sala Mantiqueira

Copa

Jardim

ICHQP 2016 – Sessions at a Glance

Room A: Centenário 1 - first floor
Room B: Centenário 2 - first floor

Room C: Tiradentes 1 - ground floor
Room D: Tiradentes 2 - ground floor

16th, October - Sunday		
09:00 - 17:00		Registration
14:00 - 17:00	ROOM A	Tutorial 1: Voltage Sags
	ROOM C	Tutorial 2: Economic Impacts of Power Quality
18:30 - 19:30		Opening Ceremony: Word from Prof. Alex Emanuel (VIDEO) - ICHQP History – D. Zaninelli
20:00 - 23:00		**Welcome Drink**

17th, October - Monday		
08:00 - 10:00	ROOM A	Analysis and Mitigation Technologies - 1A
	ROOM B	Distribution System Planning - 1B
	ROOM C	Monitoring / Reporting Methodologies and Incides - 1C
	ROOM D	Analysis and Mitigation Technologies - 1D
10:00 - 10:30	**Coffee Break**	
10:30 - 11:30	ROOM A	Plenary Session 1: "Power Quality Issues for the Integrated Grid" - Mark MacGranaghan
11:30 - 12:30		Plenary Session 2: "Predicting Cyber Attacks on the Grid Using Power Quality Measurements" - Alex McEachern
12:30 - 13:30	**Lunch Break**	
13:30 - 15:30	ROOM A	Panel 1: Power Quality Issues in Smart Grids
	ROOM C	Panel 2: Aspects of modelling and measurement of harmonic network impedance
	ROOM D	Panel 3: Harmonics Related to the Connection of Wind Parks to the Grid
15:30 - 16:00	**Coffee Break**	
16:00 - 19:00		Poster Session 1

OPENING CEREMONY
Representatives of:
CEMIG, UNIFEI, UFU, UFMG, PUCMG, FAPEMIG, FIEMG, SBQEE,
-Video Presentation by Professor Alex Emanuel.
-Brief Review of the History of the Conference Dario Zaninelli

18th, October - Tuesday

08:00 - 10:00	**ROOM A**	Renewable Generation / Distributed Generation - 2A
	ROOM B	Harmonic Generation and Propagation - 2B
	ROOM C	Case Studies - 2C
	ROOM D	Harmonic Aggregation - 2D
10:00 - 10:30	**Coffee Break**	
10:30 - 12:30	**ROOM A**	Smart Grid Technologies - Programs and Frameworks - 3A
	ROOM B	Signal Processing - 3B
	ROOM C	Monitoring / Reporting Methodologies and Indices - 3C
	ROOM D	Renewable Generation / Distributed Generation - 3D
12:30 - 13:30	**Lunch Break**	
13:30 - 14:30	**ROOM A**	Plenary Session 3: "Supraharmonics - Hype or new phenomenon?" - Math Bollen
14:30 - 15:30		Plenary Session 4: "Monitoring Power Quality" - Jovica Milanovic
15:30 - 16:00	**Coffee Break**	
16:00 - 19:00	Poster Session 2	
20:00 - 23:00	**Banquet - Preview of ICHQP 2016 at the Hotel**	

19th, October - Wednesday

08:00 - 13:30	Tour to Inhotim (Buses depart at 08:15)	
16:00 - 17:00	**ROOM A**	**Closing Ceremony: Summary of ICHQP 2016**

Chairmen Session Distribution

Monday 17th of October, 2016

Oral Session 1A	ROOM A	Morris Brenna (Polimi) and José Rubens Macedo Junior (UFU)
Oral Session 1B	ROOM B	Cristian Lazaroiu (UPB) and Antonio Zambroni (UNIFEI)
Oral Session 1C	ROOM C	Maria Cristina Roscia (Polimi) and Carlos Duque (UFJF)
Oral Session 1D	ROOM D	Rose Mary Batalha (PUC MG) and Yahia Baghzouz (UM Las Vegas)

Plenary Session 1	ROOM A	Math Bollen (LTU), José Policarpo (FIEMG)
Plenary Session 2		

Panel Session 1	ROOM A	Francisc Zavoda (IREQ - Hydro-Quebec)
Panel Session 2	ROOM C	Jan Meyer (TU Dresden)
Panel Session 3	ROOM D	Ricardo Ross (CEPEL)

Poster Session 1	FOYER	Yahia Baghzouz (UN Las Vegas) and Manoel Losada (UFMG)

Tuesday 18th of October, 2016

Oral Session 2A	ROOM A	Enrique Acha (Tampere Univ. of Technology) and Antenor Pomilio (UNICAMP
Oral Session 2B	ROOM B	Sarah Ronnberg (LTU) and Danton Ferreira (UFLA)
Oral Session 2C	ROOM C	Toshihisa Funabashi (Nagoya University) and Manfredo Lima (CHESF)
Oral Session 2D	ROOM D	Jan Meyer (TU Dresden) and Jose Carlos de Oliveira (UFU)

Oral Session 3A	ROOM A	Alfonso Capasso (U Roma La Sapiensia) and Benedito Bonatto (UNIFEI)
Oral Session 3B	ROOM B	Math Bollen (LTU) and Augusto Cerqueira (UFJF)
Oral Session 3C	ROOM C	Francisc Zavoda (IREQ) and Maria Emilia (UFP)
Oral Session 3D	ROOM D	Regina Lamedica (U Roma La Sapiensia) and Roberto Leborgne (UFRGS)

Plenary Session 3	ROOM A	Alex McEachern (Power Standards Lab) and Antonio Zambroni (UNIFEI)
Plenary Session 4		

Poster Session 2	FOYER	Julio Barros Guadalupe (UNICAN) and Roberto Leborgne (UFRGS University)

Tutorials

Tutorials Details

Two tutorials will be held in simultaneously on Sunday 16th October 2016 from 14:00 to 17:00.

Tutorial 1: Economic Impact of PQ

Philip Ciufo, Sarath Perera
Australian Power Quality and Reliability Centre
University of Wollongong

This tutorial will examine the economic impact of power quality (PQ) on customers and network operators. The economic impact of PQ is related to the impact of PQ on equipment. Impacts of PQ on equipment, which lead to economic impact, include catastrophic failure, long term loss of life, increased losses (and hence reduced efficiency) and simple maloperation. Whilst the impact of network outages on equipment is immediate and well understood, the precise impacts of PQ disturbances on equipment is less well understood, particularly for disturbances where the impact is subtle and might occur over long periods of time.

The ability to better understand the impact of PQ on equipment and to place an economic cost on PQ is highly important. By better understanding of PQ impact on equipment, the calculation of the economic impact as well as an informed review of PQ limits and allocation strategies, whether it be to loosen or tighten limits, can take place. Understanding of the economic impact of PQ allows justification of expenditure on PQ programs.

The tutorial will examine the potential impact on equipment (both customer and network) and hence economic impacts of the following disturbances:

- Steady state RMS voltage
- Voltage unbalance
- Voltage harmonics
- Voltage sags and interruptions

The main objectives for this tutorial are to:

- Provide a qualitative overview of the impacts of PQ on equipment
- Summarise the quantitative economic impacts of PQ
- Illustrate the areas of PQ impact on equipment which are not well defined an are in need of further study
- Discuss the ongoing research being conducted to better understand the impacts of PQ on network and customer equipment as well as methods for determining economic impact.

Tutorial 2 – Voltage Dips/Sags

Voltage dips are an important power quality disturbance. It remains the one that is of most interest to industrial customers and the costs due to production stoppages remain high. Although the amount of research on the subject has been reducing the last few years, there is no reason yet to forget about the subject as far from all problems related to voltage dips have been solved. Voltage dips also remain important in standardization, regulation and when setting requirements for fault-ride-through.

This tutorial will cover the classical theory on voltage dips as was introduced some 15 years ago, but also discuss some of the more recent developments.

The following subjects will be addressed:

- Origin and propagation of voltage dips; three-phase classification of dips.
- Voltage dip characterization; standard methods; limitations in standard methods; on-going developments.
- Stochastic prediction of voltage dips.
- Impact of voltage dips on equipment; mitigation methods; process-immunity   time.
- Recent developments in standardization, regulation and research.
- Open research questions.

The tutorial will be given by the following experts:

Math Bollen, Luleå University of Technology, Skellefteå, Sweden.

Roberto Leborgne, Federal University Rio Grande do Sul, Porto Alegre, Brazil.

Ying Wang, Sichuan University, Chengdu, China.

Oral Sessions

Session 1A - Analysis and Mitigation Technologies

Monday 8:00 – 10:00
Room: A
Chairs: Morris Brenna (Polimi) and José Rubens Macedo Junior (UFU)

#5 "Comparison of Two Mathematical Models for Nonlinear Residential Loads"
Andrés Henao Muñoz*, Universidad Nacional de Colombia; Andrés Julián Saavedra Montes, Univ. Nacional de Colombia

#8 "Voltage Stability Improvement to Power Systems with Energy Storage Systems"
Mitsuki Sagara*, University of the Ryukyus; Masahiro Furukakoi, University of the Ryukyus; Hidehito Matayoshi, University of the Ryukyus; Tomonobu Senjyu, University of the Ryukyus; Danish Mir sayed, Kabul University; Toshihisa Funabashi, Nagoya University

#11 "An Evaluation of Shunt Active Filtering Techniques in the Era of Smart Grids"
Jose Rubens Macedo Junior*, UFU; John Orr, WPI; Alexander Emanuel, WPI

#26 "Winding turns calculus methodology for a new 48 pulse multiconverter system employing lower cost three winding special transformers"
Angelo Rezek*, UNIFEI; Enock Ogoulola, UNIFEI; José Policarpo Abreu, UNIFEI; Luiz da Silva, UNIFEI; Valberto da Silva, UNIFEI; Adriana Izidoro, INATEL; Rafael Corrêa, UNIFEI; Carlos Borges, UNIFEI; Thiago Araujo, UNIFEI

#35 "Connection of a Series Hybrid Filter in Isolated Microgrid for Harmonic Compensation"
Hélio Marcos André Antunes*, Laboratório TESLA Engenharia de Potência -UFMG; Sidelmo Magalhães Silva, Laboratório TESLA Engenharia de Potência -UFMG; Braz de Jesus Cardoso Filho, Laboratório TESLA Engenharia de Potência -UFMG; Reginaldo Vagner Ferreira, Laboratório TESLA Engenharia de Potência -UFMG; Thiago Germano Mendes Costa, Laboratório TESLA Engenharia de Potência –UFMG

#206 "Flicker propagation in power systems supplying wind farms"
Cristian Lazaroiu*, University POLITEHNICA of Bucharest; Nicolae Golovanov, University POLITEHNICA of Bucharest; Dario Zaninelli, Politecnico di Milano; Enrico Tironi, Politecnico di Milano; Matteo Corti, Politecnico di Milano

Session 1B - Distribution System Planning

Monday 8:00 – 10:00
Room: B
Chairs: Cristian Lazaroiu (UPB), Benemar Souza (UFCG)

#29 "Assessing Maximum DG Penetration levels in a Real Distribution Feeder by using OpenDSS"
Paulo Ricardo Radatz de Freitas*, University of Sao Paulo; Jeff Smith, EPRI; Nelson Kagan, University of Sao Paulo; Celso Rocha, University of Sao Paulo; Roger Dugan, EPRI

#109 "Comparing NSGA-II and SPEA2 metaheuristics in solving the problem of optimal capacitor banks placement and sizing in distribution grids considering harmonic distortion restrictions"
jose Onaka*, UFPA; Athila Santos de Lima, UFPA; Vitor da Silva Kataoka, UFPA; Ubiratan Holanda Bezerra, UFPA; Maria Emilia de Lima Tostes, UFPA; Joao Paulo Abreu Vieira, UFPA; Carminda Moura Carvalho, UFPA

#137 "Effects of Power Quality Limits on LV-Network Design"
Michiel Nijhuis*, Eindhoven university of technology; Sjef Cobben, Liander N.V.

#160 "Optimal Capacitor Banks Placement in Distribution Grids Using NSGA II and Harmonic Resonance Chart"
Allan Manito*, Universidade Federal do Pará; Ubiratan Holanda Bezerra, UFPA; Maria Emilia de Lima Tostes, UFPA; Carminda Moura Carvalho, UFPA; jose Onaka, UFPA; Athila Santos de Lima, UFPA; Thiago Mota Soares, UFPA; Dennys Costa Mendes, CEA

#149 "Stochastic Assessment of Voltage Unbalance due to Single-Phase-Connected Solar Power"
Daphne Schwanz, Luleå University of Technology;* Math Bollen, Luleå University of Technology; Sarah Ronnberg, Lulea University of Technology; Jan Meyer, TU Dresden; Friedemann Möller, TU Dresden

#75 "The Optimal Selection of Investment Scheme for Premium Power Considering Customer Perception of Utility"
Yuan-Qian MA*, Sichuan University; Xian-Yong Xiao, Sichuan University; Yong Huang, Sichuan University; Yi Zhang, State Grid Fujian Electric Power Research Institute Fuzhou, China; Ying Wang, Sichuan University

Session 1C - Monitoring/Reporting Methodologies and Indices
Monday 8:00 – 10:00
Room: C
Chairs: Maria Cristina Roscia (Polimi), Carlos Duque (UFJF)

#20 "Tool for power quality assessment of motor fed by variable speed electric drivers"
GERSON PINHO*, UNISINOS; cesar david paredes crovato, Univ. Unisinos / Univ. Feevale; Guilherme Wojichowski, Embrasul Indústria Eletrônica Ltda

#22 "Optimized Power Quality Monitor Placement Based on a Particle Swarm Optimization Algorithm"
Rui Bertho Junior*, University of São Paulo; Thais Kempner, University of São Paulo; Jose Vieira Junior, University of São Paulo; Mário Oleskovicz, University of São Paulo; Denis Coury, University of São Paulo

#25 "ANN Scheme for Remote Monitoring of Short and Long Voltage Variations in a Distribution System"
Daniel Lima, University of São Paulo; Fernando Bottura, University of São Paulo; Mário Oleskovicz*, University of São Paulo

#50 "Research of Harmonic Distortion Power for Harmonic Source Detection"
Chang-Song Li, College of Electrical Engineering and Information Technology, Sichuan University,Chengdu, China; Zhi-Xuan Bai*, College of Electrical Engineering and Information Technology, Sichuan University; Xian-Yong Xiao, Sichuan University; Yi Zhang, State Grid Fujian Electric Power Research Institute Fuzhou, China; Ya-Mei Liu, College of Electrical Engineering and Information Technology, Sichuan University Chengdu, China

#64 "A Gapless Waveform Recorder for Monitoring Smart Grids"
Eder Kapisch*, UFJF; Leandro Manso, UFJF; Augusto Cerqueira, UFJF; Luciano Andrade, UFJF; Carlos Duque, UFJF; Paulo Ribeiro, UNIFEI

#179 "New Publicly Accessible Online Power Quality Monitoring Databases"
Kevin Kittredge*, Electrotek Concepts Inc; Daniel Sabin, Electrotek Concepts Inc.; James Lennane, Electrotek Concepts, Inc.

Session 1D – Harmonic Generation and Propagation
Monday – 08:00 - 10:00
Room: D
Chairs: Rose Mary Batalha (PUC MG), Yahia Baghzouz (UM Las Vegas)

#63 "Power Electronics in the Context of Renewables, Power Quality and Smart Grids"
Thiago Dias*, UNIFEI; Paulo Ribeiro, UNIFEI

#68 "Complex Blind Source Separation Based Harmonic Contribution Assessment"
Ya-Mei Liu, Sichuan University; Li-Hong Wang*, Sichuan University; Xian-Yong Xiao, Sichuan University; Ying Wang, Sichuan University; Fei-Yu Chen, Sichuan University

#71 "Attenuation Effect with Nonlinear Loads for Small Stand-Alone Grids"
Agknaton Bottenberg*, Ghent University; Colin Debruyne, Ghent University; Jurgen Van Ryckeghem, Ghent University; Johan Rens, North-West University; Jos Knockaert, Ghent University; Jan Desmet, Ghent University

#89 "Comparative Evaluation of Noncharacteristic Harmonic Generation by DC Transmission Systems with CSC-LCC and CSC-CCC Layouts under Assymetrical Operation Conditions"
Thiago Vieira da Silva, UFU; José Carlos de Oliveira, UFU; Paulo Silveira, Universidade Federal de Itajubá; Pedro Henrique de Oliveira Adami*, UNIFEI

#95 "Interaction between Grid-Connected PV systems and LED Lamps: Directions for Further Research on Harmonics and Supraharmonics"
Tatiano Busatto*, Luleå University of Technology; Fahim Abid, Luleå University of Technology; Anders Larsson, Luleå University of Technology; Math Bollen, Luleå University of Technology; Gaurav Singh, Clemson University

#93 "A New Emission Limit Allocation Procedure for Fluctuating Installations in Power Systems"
Mark Halpin*, Auburn University

Session 2A – Renewable Generation / Distributed Generation
Tuesday – 08:00 – 10:00
Room: A
Chairs: Enrique Acha (Tampere Univ. of Technology), Antenor Pomilio (UNICAMP)

#6 "Optimal Schedule of Dispatchable DG in Electrical Distribution Systems with Extended Dynamic Programming"
Pedro Vergara*, University of Campinas; Juan Camilo López, University of Campinas; Christiano Lyra, University of Campinas; Luiz C. P. Da Silva, University of Campinas

#16 "On the Assessment of Harmonic Emissions in Low-Voltage Power Grids with Multiple PV Generators"
Enrique Acha*, Tampere University of Technology; Xavier del Toro, UCLM; Andrii Pazynych, Tampere University of Technology

#17 "Training Algorithms Analysis for Artificial Neural Networks to Forecast Photovoltaic Generation"
Raul Arantes Monteiro*, UNIVERSIDADE FEDERAL DE UBERLANDIA; Geraldo Caixeta Guimarães, UNIVERSIDADE FEDERAL DE UBERLANDIA; Fabricio Augusto Matheus Moura, Universidade Federal do Triângulo Mineiro; Madeleine Rocio Mandrano Castillo Albertini, Universidade Federal do Triângulo Mineiro

#23 "A Control Strategy of Grid-connected Photovoltaic Inverter under Unbalanced Voltage Conditions"
Wei Cao*, North China Electric Power University; Yonghai Xu, North China Electric Power University

#30 "Harmonic Resonance in Electrical Networks with Photovoltaic Distributed Generation"
Rárison Fortes*, Universidade Federal do Acre - UFAC; Luis Origa, Universidade Estadual Paulista - UNESP; Julio Borges, Universidade Estadual Paulista - UNESP; Ricardo Buzo, Universidade Estadual Paulista - UNESP; Juan Álvarez, Universidade Estadual Paulista – UNESP

#116 "Harmonic Mitigation in Wind Power Plants: active filter solutions"
Daphne Schwanz*, Luleå University of Technology; Math Bollen, Luleå University of Technology; Anders Larsson, Luleå University of Technology; Lukasz Kocewiak, DONG Energy Wind Power

Session 2B – Case Studies
Tuesday – 08:00 – 10:00
Room: B
Chair: Sarah Ronnberg (LTU), Jose Carlos de Oliveira (UFU)

#117 "Hybrid Filter for Dynamic Harmonics Filtering and Reduction of Commutation Notches – A Case Study"
Henning Tischer*, Maschinenfabrik Reinhausen GmbH; Tomaz Pfeifer, Reinhausen 2E

#19 "Real Time Digital Simulator Studies for Performance Evaluation of Static VAr Compensators in Low Short Circuit Level Power Grids: The Tauá II SVC Example"
Manfredo Lima*, Chesf; Paulo Fernando Ribeiro, UNIFEI

#21 "Analysis and Tests of Power Quality in Aviation Environment"
Joao Alves*, Embraer; Jose Pomiio, UNICAMP; Pedro Figueiredo, Embraer; Ivan Malizia, Embraer

#58 "Assessing the Severity of Voltage Sags Due to Short Circuits in Transmission and Distribution Grids"
Norbert Essl*, Graz University of Technology; Herwig Renner, Graz University of Technology

#82 "Impact of Load Modeling on the Harmonic Impedance seen from the Transmission Network"
Fani Barakou*, Eindhoven University of Technology; Math Bollen, Luleå University of Technology; Shima Mousavi-Gargari, TenneT TSO B.V.; Oscar Lennerhag, STRI AB; Peter Wouters, Eindhoven University of Technology; Fred Steennis, DNV-GL/Eindhoven University of Technology

#113 "Survey of Harmonic Current Unbalance in Public Low Voltage Networks"
Ana Blanco-Castaneda*, Technische Universität Dresden; Jan Meyer, TU Dresden; Roberto Langella, Second University of Naples; Peter Schegner, Dresden University of Technology; Alfredo Testa, Seconda Universita degli Studi di Napoli

Session 2C – Analysis and Mitigation Technologies
Tuesday – 08:00 – 10:00
Room: C
Chairs: Jovica Milanovic (University of Manchester), Antonio Zambroni (UNIFEI)

#36 "A Review of Solutions for Harmonic Mitigation"
Daphne Schwanz*, Luleå University of Technology; Math Bollen, Luleå University of Technology; Anders Larsson, Luleå University of Technology

#37 "Active Harmonic Filters: control techniques review"
Daphne Schwanz*, Luleå University of Technology; Azam Bagheri, Luleå University of Technology; Math Bollen, Luleå University of Technology; Anders Larsson, Luleå University of Technology

#39 "Signal-Tuned Gabor Approach for Power Disturbance Classification"
Julio Ferreira, IFTM; José Torreão*, UFF; Silvia Victer, UERJ

#42 "Developments in Voltage Dip Research and Its Applications, 2005-2015"
Azam Bagheri*, Luleå University of Technology; Math Bollen, Luleå University of Technology

#65 "Small-Signal Modeling of a Single-Phase DVR"
Angelo Rezek*, UNIFEI; Lucas Jardim Meloni, UNIFEI

#70 "Harmonic Analysis of Static var Compensator Operating under Distorted Voltages"
Eduardo Liberado*, UNICAMP; Jose Pomiio, UNICAMP; Fernando Marafão, UNESP

Session 2D – Monitoring/Reporting Methodologies and Indices
Tuesday – 08:00 – 10:00
Room: D
Chairs: Jan Meyer (TU Dresden), Danton Ferreira (UFLA)

#66 "Multidimensional Monitoring for Power Quality Disturbance Detection"
Thais Mendes*, Universidade Federal de Lavras; Danton Ferreira, UFLA; Carlos Duque, UFJF

#74 "Proposal of a Power Factor Correction Methodology in a Nonlinear Load Scenario"
Fernando de lima*, UFMT; Alex Braga, UFMT; Bismarck Castillo Carvalho, UFMT; Antonio de Pádua Finazzi, UFMT; Etiane Ponciano, UFMT

#88 "Assessment of Voltage Instrument Transformers Accuracy for Harmonic Measurements in Transmission Systems"
Robert Stiegler*, TU Dresden; Jan Meyer, TU Dresden; Dr. Jako Kilter, Tallinn University of Technology; Simon Konzelmann, TenneT TSO GmbH

#100 "Methods of representing the results of voltage fluctuation indices measurements"
Grzegorz Wiczynski*, Poznan University of Technology

#120 "Assessment of Power Quality Performance in Distribution Networks - Part I: Measurement Campaign and Initial Analysis"
Etienne Gasch, Technische Universitaet Dresden; Max Domagk, Technische Universitaet Dresden; Jan Meyer*, TU Dresden; Sami Abdelrahman, The University of Manchester; Huilian Liao, The University of Manchester; Jovica Milanovic, University of Manchester

Session 3A – Smart Grid Technologies, Programs and Frameworks
Tuesday – 10:30 – 12:30
Room: A
Chairs: Alfonso Capasso (U Roma La Sapiensia), Benedito Bonatto (UNIFEI)

#123 "Bio-inspired Metaheuristics Applied to Volt/VAr Control Optimization Problem in Smart Grid Context"
Thiago Medeiros*, University of Sao Paulo; Nelson Kagan, University of Sao Paulo

#136 "Substation-based Self-healing System with Advanced Features for Control and Monitoring of Distribution Systems"
Bruno Nakata*, Sinapsis Inovação em Energia; Daniel Duarte, Sinapsis Inovação em Energia; João Guaraldo, Sinapsis Inovação em Energia; Henrique Kagan, Sinapsis Inovação em Energia; Paulo Pranskevicius, AES Eletropaulo; Argeu Suematsu, AES Eletropaulo; Mayra Hoshina, AES Eletropaulo; Marcel Martinelli, AES Eletropaulo

#141 "Algorithm for decentralized Volt/VAr Control in Distribution Networks"
Diego Echeverry*, NAPREI/USP; Luiz Rosa, NAPREI/USP; Juan Garcia, NAPREI/USP; Carlos Almeida, University of Soo Paulo; Thiago Medeiros, University of Sao Paulo; Nelson Kagan, University of Sao Paulo

#144 "A Laboratory infrastructure to support utilities in attaining Power Quality and Smart Grid goals"
Luiz Rosa*, NAPREI/USP; Nelson Kagan, University of Sao Paulo; Carlos Almeida, University of São Paulo

#166 "A Combined MV and LV Network Voltage Regulation Strategy for the Reduction of Voltage Unbalance"
Nurul Izzah Mohammad Afandi*, University of Wollongong; Phil Ciufo, University of Wollongong; Ashish Agalgaonkar, University of Wollongong; Sarath Perera, University of Wollongong

Session 3B – Signal Processing
Tuesday – 10:30 – 12:30
Room: C
Chairs: Math Bollen (LTU), Augusto Cerqueira (UFJF)

#28 "Matrix Analysis of Power in 3-Phase System"
Leszek Ladniak*, Wroclaw University of Technology

#48 "Additional Information from Voltage Dips"
Azam Bagheri*, Luleå University of Technology; Math Bollen, Luleå University of Technology

#53 "A Real Time Implementation of an Harmonic Impedance Estimator"
Henrique Luis Monteiro*, Universidade Federal de Juiz de Fora; Renato Ribeiro, Universidade Federal de Juiz de Fora; Paulo Ribeiro, UNIFEI; Mateus Mostaro, Universidade Federal de Juiz de Fora; Carlos Duque, UFJF

#61 "Comparative Analysis of Segmentation Methods, Including Adaptive and HOS Based Algorithms"
Enrique Alameda-Hernandez*, Universidad de Granada; Fernando Aznar, Universidad de Granada; Guillermo Botella, Universidad Complutense

#106 "Harmonic Extraction based on Independent Component Analysis and Quadrature Matched Filters"
Patrick Oliveira*, UFJF; Marcelo Lima, UFJF; Augusto Cerqueira, UFJF; Danton Ferreira, UFLA; Carlos Duque, UFJF

#81 "Analysis of the Influence of the Window Used in the Short-Time Fourier Transform for High Impedance Fault Detection"
Érica Lima*, UFCG; Núbia Brito, UFCG; Benemar Souza, UFCG; Wellinsílvio Santos, UFCG; Laís Fortunato, UFCG

Session 3C – Harmonic Aggregation
Tuesday – 10:30 – 12:30
Room: C
Chairs: Francisc Zavoda (IREQ), Maria Emilia (UFP)

#101 "Performance Analysis of the Current Summation Law in Wind Generation"
Ivan Santos*, UFU; Laís Bonfim, UFU

#152 "Summation Rule for Wind Turbines' Harmonics Challenged by Measurements"
Koen Van Reusel*, KU Leuven

#163 "Harmonic Interaction of Electric Vehicle Chargers in a Central Charging Infrastructure"
Agustin Malano*, Universidad Tecnologica Nacional San Rafael; Jan Meyer, TU Dresden; Sascha Mueller, Technische Universitaet Dresden, Germany; Sebastian Bachmann, Belectric Drive Kitzingen, Germany

#194 "Harmonic Emission of PV Inverters under Different Voltage Supply Conditions and Operating Powers"
Xiao Xu, The University of Edinburgh; Adam Collin, The University of Edinburgh; Sasa Djokic*, University of Edinburgh; roberto langella, Second University of Naples; Alfredo Testa, Seconda Universita degli Studi di Napoli; Jan Meyer, TU Dresden; Friedemann Möller, TU Dresden

#201 "A Comparison between Circuit-Based and Harmonic-Current-Source Models for Compact Fluorescent Lamps"
Gabriel Malagon*, UIS; Jeisson Bello, UIS; Gabriel Ordoñez Plata, Universidad Industrial de Santander; César Duarte Gualdrón, Universidad Industrial de Santander

#148 "A Control Strategy of a Hybrid Active Filter for Operation with Harmonically Unbalanced Voltages and Currents"
Leopold Herman*, Faculty of electrical engineering, University of Ljubljana; Bostjan Blazic, University of Ljubljana; Igor Papic, University of Ljubljana

Session 3D – Renewable Generation/Distributed Generation
Tuesday – 10:30 – 12:30
Room: D
Chairs: Regina Lamedica (U Roma La Sapiensia), Roberto Leborgne (UFRGS)

#31 "Analysis of Power Quality for Photovoltaic Systems"
Victor Ramon*, CEAR-UFPB; Kleber Oliveira, CEAR-UFPB; Manoel Alves, IFPB

#38 "Fault Location in Distribution Network with Inverter-Interfaced Distributed Energy Resources in Limiting Current"
Cesar Orozco*, Universidad del Norte; Arturo Bretas, University of Florida; Andrés Herrera, UFRGS University; Roberto Leborgne, UFRGS University; Sergio Martinez, Technological Foundation of Antonio de Arévalo

#44 "Computation of Stationary State of Grid-Tied Photovoltaic Systems via Harmonic Domain"
ABNER RAMIREZ*, CINVESTAV-GUADALAJARA; JESUS MORALES, École Polytechnique de Montréal; GERMAN COMBARIZA, Pontifical Xavierian University

#46 "Analysis of Current Distortion in a 12 kW Photovoltaic System Installation"
Yahia Baghzouz*, UNLV

#73 "Coordinated Control of Distributed Generators in Meshed Low-Voltage Microgrids: Power Flow Control and Voltage Regulation"
Danilo Brandao*, Federal University of Minas Gerais; Jose Pomiio, UNICAMP; Tomasso Caldognetto, University of Padova; Simone Buso, University of Padova; Paolo Tenti, University of Padova

#92 "Mitigation of Harmonic Current Produced by Wind Turbine throughout Converter Switching Control"
Alex Reis*, University of Brasilia; Leandro Moura, Universidade Federal de Uberlândia; José Carlos de Oliveira, UFU

Panel Sessions

Panel Sessions - Monday

1 - Power Quality Issues in Smart Grid
Chair: Francisc Zavoda

The implementation of the "Smart grid" concept has helped improving the reliability of the power system but the impact on power quality is more complex. Sometimes it provides power with better quality but the overwhelming presence of power electronics (i.e. the interface for load and distributed generation), increases the level of emissions affecting the power quality. The panel is intended to discuss different aspects related to power quality issues such as: changes in interference, new mitigation, new equipment connected to the grid, new ways of operating and monitoring the power system.

Panelists:
1. Math Bollen - Luleå University of Technology, Sweden: Changes in production, consumption and the grid and their impact on the probability of interference
2. Jan Meyer - Technische Universitaet Dresden, Germany: New aspects of mitigation
3. Cristian Lazaroiu - University Politehnica of Bucharest, Romania: Microgrids and power quality
4. Sarah Rönnberg - Luleå University of Technology, Sweden: Power quality issues introduced by new types of equipment
5. Francisc Zavoda - IREQ(Hydro-Quebec), Canada: Power quality monitoring in Smart grids

2 - Aspects of Modelling and Measurement of Network Harmonic Impedances
Chair: Jan Meyer (TU Dresden, Germany)

Aspects of modelling and measurement of harmonic network impedance In order to study levels and propagation of low and high frequency emission (harmonics and supraharmonics), knowledge about the network impedance at these frequencies is of crucial importance. The panel is intended to discuss different aspects of modeling, simulation and measurement of network harmonic impedance. It addresses both issues in transmission and distribution networks.

Panelists:
1. Igor Papic - University of Ljubljana, Slovenia: "Importance of harmonic system impedance for harmonic emission determination"
2. Math Bollen - Luleå University of Technology, Sweden: "The role of impedances at higher frequencies"
3. Jovica Milanovic - The University of Manchester, UK; J. Matejic, B. Mihic, P EMS (TSO), Serbia: "Operational and economic implications of transmission level harmonics in future power grids"
4. Carlos Duque - Federal University of Juiz de Fora, Brazil: "Power system impedance measurement based on wavelet voltage imposed"
5. Ana-Maria Blanco; Jan Meyer, Technische Universitaet Dresden, Germany: "Impact of electronic equipment on harmonic network impedance in residential low voltage Networks

3 - Harmonics Related to the Connection of Wind Parks to the Grid
Chair: Ricardo Penido Ross (Cepel, Brazil)

The connection of Wind Parks to the transmission and distribution grid has seen a robust growth from the year 2002 to 2014 and the global renewables capacity addition has evolved from 15% to 45% of all generation additions. The majority of the wind plants use electronic converters' technology associated to the wind turbine generators (WTG). These converters together with the controllers are responsible for improvements related to higher energy production and ancillary functions such as reactive and frequency control. Nevertheless, an unwanted impact appears in these connections: harmonic currents generated or absorbed by the Wind Park system. The panel is intended to discuss different aspects related to harmonic emissions, and harmonic limits / grid-codes.

Panelists:
1. Mark Halpin, Auburn University, USA: "Harmonic Limits Overview – IEEE 519 and European Standards"
2. Fabiano Oliveira, ONS, Brazil: "Systems Operator Perspective"
3. Ricardo Ross, CEPEL, Brazil: "Systems Analysis Perspective"

Poster Sessions

Monday – 16:00 - 19:00 - Room C
Chairs: Yahia Baghzouz (UN Las Vegas), Manoel Losada (UFMG)

#7 "Increasing the PV Hosting Capacity with OLTC Technology and PV VAr Absortion in a MV/LV Rural Brazilian Distribution System"
David A. Sarmiento, University of Campinas; Pedro Vergara*, University of Campinas; Luiz C. P. Da Silva, University of Campinas; Madson C. de Almeida, University of Campinas

#10 "Intrument Voltage Transformer: Time-Response to Fast Impulse"
Regina Lamedica*, Sapienza University of Rome; Massimo Pompili, Sapienza University of Rome; Alessandro Ruvio, Sapienza University of Rome; Silvia Sangiovanni, Sapienza University of Rome; Bruno Cauzillo, Sapienza University of Rome; Luigi Calcara, Sapienza University of Rome

#33 "Power Efficiency and Power Quality in Residential Lighting System"
Arnulfo Vasconcellos*, Federal University of Mato Grosso - UFMT; Teresa Malheiro, IFMT; Marllon Schlischting, UFMT; Gabriela Campos, UFMT; Fabricio Santilio, UFMT; Lucas Rosa, UFMT

#85 "ICA-based Method for Power Quality Disturbance Detection"
Erick Akio Nagata*, Federal University of Lavras; Danton Ferreira, UFLA; Carlos Duque, UFJF

#118 "Analysis Of Electromagnetic Transients In Reactive Compensators Type MSCDN - Mechanically Switched Capacitor With Damping Network"
Paula Candida*, Puc Minas; Mario Alves, Puc Minas

#126 "Load Transients Assessment"
Eduardo Cano-Plata*, Universidad Nacional de Colombia; Hernan Tacca, Universidad de Buenos Aires; Armando Ustariz-Farfan, Universidad Nacional de Colombia; Santiago Arias-Guzman, Universidad Nacional de Colombia; Oscar Ruiz-Guzman, Universidad Nacional de Colombia

#121 "Assessment of Power Quality Performance in Distribution Networks - Part II: Performance Indices and ranking of network busses"
Sami Abdelrahman*, University of Manchester; Huilian Liao, The University of Manchester; Jovica Milanovic, University of Manchester; Etienne Gasch, Technische Universitaet Dresden; Max Domagk, TU Dresden; Jan Meyer, TU Dresden

#77 "Optimization of passive filtering systems used for mitigating harmonics in distribution networks"
Juan Álvarez*, Universidade Estadual Paulista - UNESP; Luis Origa, UNESP; Julio Borges, Universidade Estadual Paulista - UNESP; Ricardo Buzo, Universidade Estadual Paulista - UNESP; Rárison Fortes, Universidade Federal do Acre – UFAC

#84 "Utilization of Harmonics Current in Single Phase System"
Hussein Al-bayaty*, Plymouth; Marcel A. Ambroze, Plymouth University; Mohammed Zaki, Plymouth University

#91 "A Novel Fault Classification Method Using Wavelet Transform and Artificial Neural Networks"
Rafael Sosa, Universidad de los Andes; Angela Castañeda, Universidad de los Andes; Juan Camarillo-Peñaranda*, Universidad de los Andes; Gustavo Ramos, Universidad de los Andes

#96 "Prediction of Total Harmonic Distortion Based on Harmonic Modeling of Nonlinear Loads Using Measured Data for Parameter Estimation"
Daniel Braga*, CEFET-MG; Patricia Jota, CEFET-MG

#99 "Determination of the parameters of voltage variation with voltage fluctuation indices"
Grzegorz Wiczynski*, Poznan University of Technology; Mateusz Michalski, Poznan University of Technology

#18 "Probabilistic Approach to Voltage Sag Indices"
Maria Teresa Correia De Barros*, IST-Universidade De Lisboa; Andre Santos, REN

#62 "Statistical Analysis and Modeling of Repair Data from a Brazilian Power Distribution System"
Michel Bessani*, USP; Rodrigo Fanucchi, Copel Distribution S/A; Jorge Achcar, FMRP/USP; Carlos Maciel, EESC/USP

#80 "Failure Rate Prediction under Adverse Weather Conditions in an Electric Distribution System Using Negative Binomial Regression"
Rodrigo Fanucchi*, Copel Distribution S/A; Michel Bessani, University of São Paulo; Carlos Maciel, EESC/USP; João London Junior, EESC/USP; Marcos Camillo, Copel Distribution S/A

#125 "Application of an alternative methodology for evaluating power quality monitors"
Rodrigo Silva*, University of Brasilia; Carlos Sañudo, University of Brasília; Anésio Filho, University of Brasília

#133 "Impact of Assessment Period on Voltage THD Measurements"
Sean Elphick*, Australian Power Quality & Reliability Centre, University of Wollongong; Phil Ciufo, University of Wollongong; Vic Smith, Australian Power Quality & Reliability Centre, University of Wollongong; Gerrard Drury, Australian Power Quality & Reliability Centre, University of Wollongong

#72 "A PMU-based Distribution System Harmonic State Estimation using Parallel Processing"
Igor Melo*, Federal University of Juiz de Fora; José Pereira, UFJF; Abilio Variz, UFJF; Bráulio Oliveira, UFJF

#129 "Estimating Power Factor of Induction Motors Using Regression Technique"
mohammadali khodapanah*, Brunel university; Ahmed Zobaa, Brunel university; Maysam Abbod, Brunel University London

#156 "Overview of methods for voltage sag performance estimation"
Ivan Benedict Nilo Cruz*, Electrical and Electronics Engineering Institute, University of the Philippines Diliman; Athena Lavega, University of the Philippines Los Baños; Jordan Orillaza, Electrical and Electronics Engineering Insitute, University of the Philippines, Diliman

#49 "Challenges in the Calculation methods of Point-on-Wave Characteristics for Voltage Dips"
Ying Wang*, Sichuan University; Xian-Yong Xiao, Sichuan University; Math Bollen, Luleå University of Technology

#86 "Different Fault Types and Voltage Dips in relation to Shielding of Subtransmission Lines"
Math Bollen*, Luleå University of Technology; Oscar Lennerhag, STRI AB

#105 "Frequency response of revenue meters in measured active energy"
Jiri Drapela*, Brno University of Technology; Jan Novotny, Brno University of Technology; Dr. David Topolanek, BRNO UNIVERSITY OF TECHNOLOGY

#54 "Limitations in the use of the IEC standard method for detection and analysis of rapid voltage changes in power system networks"
Julio Barros*, University of Cantabria; Puri Saiz, University of the Basque Country; Matilde de Apráiz, University of Cantabria; Luis Alberto Leturiondo, University of the Basque Country; Ramón I. Diego, University of Cantabria; José Julio Gutierrez, University of the Basque Country

#131 "System for Metrological Assessment of PMUs under Voltage Sags"
Marcelo Britto Martins*, INMETRO; Rosane Moreira Debatin, INMETRO; Marcelo Britto Martins, INMETRO; Ana Maria Ribeiro Franco

#184 "Survey on International Practice of Calculating Harmonic Current Emission Limits"
Jan Meyer*, Technische Universitaet Dresden; Max Domagk, Technische Universitaet Dresden; Luzie Kirchner, Technische Universitaet Dresden; Kaveh Malekian, Technische Universitaet Chemnitz; Farhad Safargholi, Technische Universitaet Chemnitz; Max Hoven, FGH - Forschungsgemeinschaft fuer Elektrische Anlagen und Stromwirtschaft e.V., Aachen; Issam Athamna, FGW e.V. - Foerdergesellschaft Windenergie und andere Erneuerbare Energien, Berlin; Marko Muehlberg, FGW e.V. - Foerdergesellschaft Windenergie und andere Erneuerbare Energien, Berlin; Fynn Scheben, M.O.E. GmbH, Itzehoe; Florian Ackermann, Frauenhofer-ISE, Freiburg; Rainer Klosse, WindGuard Certification GmbH, Varel; Karsten Kuech, WindGuard Certification GmbH, Varel

#191 "A Bidirectional Single-Phase Hybrid Rectifier Proposal for Sinusoidal Input Current Imposition, DC Bus Voltage Regulation and Active Power Injection onto the AC Grid"
Bárbara Maria A Ribeiro*, Danillo Borges Rodrigues, Luiz Carlos Gomes Freitas, Gustavo Brito Lima

#124 "Study of Financial Losses due to Harmonic Distortion in a Telephone Switching Office"
Clovis Almeida*, Centro Universitário Jorge Amado

#142 "Impact of Electricity Theft on Power Quality"
Lucas Arango*, Universidade Federal de Itajubá; Elcio Deccache, Universidade Federal de Itajubá; Hector Arango, Universidade Federal de Itajubá; Benedito Bonatto, Centro de Excelência em Redes Elétricas Inteligentes; Paulo Ribeiro, UNIFEI; Paulo Silveira, Universidade Federal de Itajubá

#67 "Single Phase Dynamic Voltage Conditioner Control under Load Variation"
Hossein Hafezi*, Politecnico Di Milano; Roberto Faranda, Politecnico Di Milano; Maria Carmen Falvo, University of Rome Sapienza

#104 "Comparative Analysis of Regulatory Procedures for classifying Short-Duration Voltage Variations"
Elisa Monteiro*, University of Brasília; Anésio Filho, Universidade de Brasília

#155 "Power Quality of LED Lamps"
Carminda Moura Carvalho*, UFPA; Guilherme dos Santos Oliveira, UFPA; Eric Pinto de Oliveira, UFPA; Adriano Paranhos da Silva, UFPA

#43 "Reduced-Order Extended Harmonic Domain Modeling of Switched Networks"
Uriel Vargas*, Cinvestav-Guadalajara; Abner Ramirez, Cinvestav-Guadalajara

#107 "Switching Instant Variation Correction and Control for the Harmonic State Space Model of a Closed-Loop Balanced Thyristor Controlled Series Compensator"
Miguel Alberto Mercado*, Electrical and Electronics Engineering Insitute, University of the Philippines, Diliman; Jordan Orillaza, Electrical and Electronics Engineering Insitute, University of the Philippines, Diliman

#143 "Comparative Analysis of Instruments Measuring Time-Varying Harmonics"
Frederico Carvalho*, UNIFEI; Fernando Belchior, UFG; Paulo Ribeiro, UNIFEI

#9 "Influence Of Harmonic Distortion in Current Transformer"
Evandro Vaciloto*, General Electric; Marília Ribeiro, General Electric; Paula Salomé, GE; Paulo Ribeiro, UNIFEI

#41 "Flicker and Driver Topology Assessment of Extra Low Voltage LED Lamps under DC Supply"
Leos Kukacka*, Technical University of Liberec; Prof. Jiri Drapela, BRNO UNIVERSITY OF TECHNOLOGY

#47 "Comparative Study of the Harmonic Impact of Different Plug-in Electric Vehicles and Charging Stations – A Brazilian Case Study"
Ricardo Torquato*, University of Campinas; Fernanda C. L. Trindade, University of Campinas; Walmir Freitas, University of Campinas; Gláucio R. T. Hax, Center for Research and Development (CPqD); Vitor T. Arioli, Center for Research and Development (CPqD)

#127 "Analysis of the Influence of Non-Linear Loads on the Measurement and Billing of Electrical Energy Compared with the CPT"
Vinícius Farias Brito*, UFMT; Guilherme Yuji Kume, UFMT; Mateus Siqueira Quinalia, UFMT; Mateus Alecio Sachetti, UFMT; Roberto Perillo Barbosa da Silva, UFMT; Wesley Angelino de Souza, UNICAMP; Luiz Carlos Pereira da Silva, UNICAMP

#98 "High Frequency Harmonic Distortions Measured in a Brazilian Solar Farm"
Ricardo Torquato*, University of Campinas; Walmir Freitas, University of Campinas; Gláucio R. T. Hax, Center for Research and Development (CPqD); Antônio Donadon, Companhia Paulista de Força e Luz (CPFL); Rafael M. R. Pereira, Companhia Paulista de Força e Luz (CPFL)

#119 "Effects of Interruptions in a RBS: Evaluation of Quality Indicators and the Study of Mobile Telephony Revenue Variation in an Operator"
Gilvan Cunha*, Federal University of Bahia; Daniel Barbosa, Federal University of Bahia; Kleber da Silva, Salvador

#145 "A Critical Analysis of the Harmonic Distortion Procedure Applied to Wind Farm Connection"
Isaque Gondim*, Federal University of Uberlandia; Arnaldo José Pereira Rosentino Junior, Federal University of Mato Grosso; Alex Reis, University of Brasilia; José Carlos de Oliveira, UFU

#108 "Multitrafo-App: Web App for Project of 18-Pulses Rectifiers with Differential Transformer Connections"
Priscila Oliveira*, UFT; Stefani Carolline Freitas, UFT; Tércio Silva, UFT; Falcondes Seixas, UNESP

#110 "Mitigation of harmonic distortion with passive filter"
Bruno Pires de Campos*, Universidade Federal de Itajubá; Luiz Sousa, Universidade Federal de Itajubá; Paulo Ribeiro, Universidade Federal de Itajubá

#112 "Voltage Profile Modification in Harmonically Affected power Networks"
Hadi Hosseinian Yengejeh*, Curtin University; Syed Islam, Curtin University; Sadjad Galvani, Urmia University

#114 "Active / Passive Harmonic Filters: Applications, Challenges & Trends"
Lukas Motta*, EPCOS AG; Nicolas Faundes, EPCOS AG

#135 "Analysis of the Statcom use to Mitigate the Effects of Voltage Sags on the Wind Farms Operation. A Study Case"

Martín Cruz Rodríguez Paz*, Universidade Federal do Pampa; Ana Maria Zornita de Alencar, Messtechnik Business and Instrumentations

#159 "Study of Control Strategies for Shunt Active Power Filter for Harmonics Suppression"

Sambasivaiah Puchalapalli*, Indian Institute of Technology Gandhinagar; Naran M. Pindoriya, Indian Institute of Technology Gandhinagar

#162 "Development of a Low Frequency Magnetic Field and Harmonic Current Meter"

Carlos Caetano*, Federal University of Minas Gerais; Pedro Assunção, UFMG; Faiossander Suela, UFMG; Wallace Boaventura, UFMG; José Paulino, UFMG

#203 "Impact of reactive-power optimization on voltages in a power system"

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Roberto Langella*, Seconda Universita degli Studi di Napoli; Alfredo Testa, Seconda Universita degli Studi di Napoli; Sasa Djokic, University of Edinburgh; Jan Meyer, TU Dresden; Matthias Klatt, Technische Universitaet Dresden

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Lucas Pulz*, UFRGS; Roberto Leborgne, UFRGS University

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