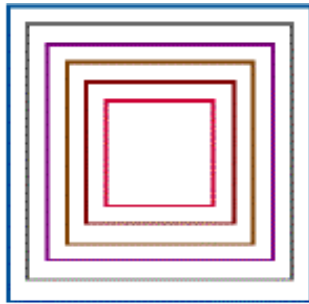


# Preliminary Programme



*14-th* **P S C C**

# Sevilla 2002

Spain

June 24-28





SAINCO



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# Welcome to PSCC'02 in Sevilla

It is our honour and pleasure to invite you to the 14<sup>th</sup> Power Systems Computation Conference, taking place this time in Sevilla, Spain. There is really no need for this event to be presented, as even people who have never attended any of the previous PSCCs are aware of the technical excellence and especial social atmosphere that has always characterized this series of conferences, since they originated back in the sixties. Those who have come several times, become members of a selected group of people which, like a large family, look forward to meet every three years at this *rendezvous*.

As a consequence, the number of submitted papers shows a steady trend to increase. On this occasion, over 460 full papers have been reviewed by the Technical Programme Committee, of which only 221 have been accepted for oral presentation. Many good papers had to be rejected because of the upper limit imposed by the number of parallel sessions. Apart from regular papers, the technical programme is complemented with a tutorial course, several survey papers in which leading experts discuss timely topics and a panel session that closes the conference. Like in the last two PSCCs, a significant portion of papers is devoted to the ongoing power industry restructuring process, but regular theoretical developments and practical applications are also dealt with.

This is the first PSCC organized in the XXI century and, accordingly, we felt the need to adapt our procedures to the internet era. The main outcome of this effort is an efficient web-based system for uploading and reviewing papers. Attendees can also register on-line if they wish and, for the first time in the power engineering area, they are able to download in advance accepted papers, which should stimulate technical discussions during the conference. As we, electrical engineers, do know, any abrupt change implies a transient period in which natural responses occur. Therefore, we apologize to those who have observed such unexpected responses for the inconveniences they may have caused.

Thanks to our several sponsors, particularly Endesa, and to the generosity of the University of Sevilla, the registration fee for the PSCC'02 is lower than that of any other conference organized in the last few years, at least to our knowledge. We believe the social programme, traditionally composed of a reception, an excursion and a dinner, is quite attractive and will satisfy the most exigent attendant.

The Local Organising Committee has made its best to assure that your stay in Sevilla is fruitful and joyful. Following the flamenco terminology, it is frequently stated that this city has a *duende* who captivates every visitor and forces him/her to come back once more. On behalf of the *duende*, we wish to welcome you to the PSCC'02, keeping our fingers crossed for the weather to be nice.



**Antonio Gómez Expósito**  
Chairman of the LOC



**Maria Teresa Correia de Barros**  
President of the 14<sup>th</sup> PSCC

# PSCC Bodies

## President of Council

Y. Sekine, Japan

## President of 14th PSCC

M. T. Correia de Barros, Portugal

## Executive Board

M. Laughton, United Kingdom (Chairperson)

M. T. Correia de Barros, Portugal, (Vice-Chairperson)

H. J. Koglin, Germany, (Secretary)

H. Glavitsch, Switzerland, (Treasurer)

G. Andersson, Sweden

P. Bornard, France

T. Dillon, Australia

## Technical Programme Committee

**Chair:** P. Bornard, France

**Vice-chair:** G. Andersson, Switzerland

|                           |                      |                      |
|---------------------------|----------------------|----------------------|
| F. Alvarado, USA          | T. Gómez, Spain      | N. Martins, Brazil   |
| M. P. Bongrain, France    | N. Hadj Said, France | D. Niebur, USA       |
| A. Bose, USA              | D. Hill, Australia   | T. Overbye, USA      |
| C. Cañizares, Canada      | R. Hirvonen, Finland | K. Padiyar, India    |
| R. Cherkaoui, Switzerland | N. Jenkins, UK       | L. Söder, Sweden     |
| S. S. Choi, Singapore     | M. Kato, Japan       | P. Schegner, Germany |
| S. Corsi, Italy           | H. Laffaye, France   | V. Stroeve, Russia   |
| T. van Cutsem, Belgium    | C.C. Liu, USA        | K. Takahashi, Japan  |
| K. David, Hong Kong       | J. Lopes, Portugal   | L. Wehenkel, Belgium |
| A. Ekwue, UK              | P. Marannino, Italy  | W. Wellssow, Germany |
| O. Fosso, Norway          | J. Marti, Canada     | Y. Xue, China        |
| J. Giri, USA              | J. Martínez, Spain   | A. Yokoyama, Japan   |
| J. Reynders, South Africa |                      |                      |

Technical support for the TPC Web-based information technology has been provided as a service by R. Bacher Consulting, in cooperation with the staff of the power systems laboratory, ETH Zürich.

## Local Organising Committee

**Chair:** A. Gómez Expósito, University of Sevilla, Spain

**Vice-chair:** J. Alonso Rodríguez, Endesa, Spain

### Other Members:

Jesús Riquelme Santos

Esther Romero Ramos

José A. Rosendo Macías

**Conference Secretariat:** Atlanta Viajes, Luis Montoto 107, 41007 Sevilla, Spain.

Phone: 34 954 581 101. Fax: 34 954 580 646.

e-mail: unicongsvq@atlantaviajes.es

## Meetings of PSCC Bodies

PSCC bodies will meet in the “Sala de Juntas” room (uppermost floor) according to the following schedule:

- **TPC:** Monday, at 18.00.
- **ExBoard:** Monday, at 19.00.
- **General Assembly:** Tuesday at 17.30.

## General Information

### Location

The PSCC’02 Conference will take place at the Engineering School, Camino de los Descubrimientos, Isla de la Cartuja, close to Cartuja’93 Scientific and Technological Park.

### Language

The conference language is English.

### Transportation

International flights to Sevilla arrive from UK and other European starting points. Other international flights to Spain arrive to Madrid, Barcelona or Malaga airports. Madrid is connected to Sevilla in less than one hour by several flights every day. The distance from

Sevilla-San Pablo airport to down town is about 8 km; the taxi fare is about 18 € If you prefer the car, Sevilla is connected through highways with Madrid (538 km), Málaga (200 km), Granada (250 km.) and other major cities (speed limit 120 km/h). There is also a high speed train (AVE) from Madrid to Sevilla every hour from 7:00 a.m. to 11:00 p.m. The trip is two hours and a half, arriving to Santa Justa Station, which is very close to the city center.

## **Conference Proceedings**

All conference papers will be published in the CD which is included in the registration fee for the participants. The CD will be available at registration.

## **Weather**

Sevilla has a Mediterranean climate, with an average maximum temperature of 35 °C and an average minimum of 18 °C in June.

## **Accommodation**

Atlanta Travel Agency is the official Travel Agency selected by PSCC'02 for the conference. Through Atlanta, participants can get additional facilities, such as special rates arranged with hotels, confirmation and reservation management.

The Conference Secretariat has made reservations at hotels in various price categories. Most hotels are situated in, or near to the city centre. The number of rooms within each category is limited. Please fill in the accommodation request.

## **Local Transportation**

Bus transportation will be provided from Tuesday to Friday connecting the conference venue with conference hotels and social event places. Schedule is as follows:

|           |       |                     |
|-----------|-------|---------------------|
| Tuesday   | 8.00  | Hotel to Conference |
|           | 22.15 | Conference to Hotel |
| Wednesday | 8.30  | Hotel to Conference |
|           | 17.30 | Conference to Hotel |
|           | 18.45 | Hotel to Arenales   |
|           | 22.30 | Arenales to Hotel   |
| Thursday  | 8.30  | Hotel to Conference |
|           | 19.10 | Conference to Hotel |
|           | 20.15 | Hotel to Banquet    |
|           | 22.30 | Banquet to Hotel    |
| Friday    | 8.30  | Hotel to Conference |
|           | 14.10 | Conference to Hotel |

# Technical programme

The conference will be divided in two main parts:

- An optional tutorial session on Monday, June 24, entitled “**A decade of electricity deregulation: Fundamentals, Experiences, and Lessons to be learned**”.
- The Conference (properly so called) held from Tuesday, June 25, to Friday, June 28. The conference consists of 43 technical sessions, 2 survey papers, a case study and a panel session.

## Tutorial Session

The course consists of six sessions to be held at the “Salón de Grados” room (uppermost floor) with the following schedule:

- Session 1: 9.30-10.30  
Fundamentals of electricity markets. Ignacio Pérez-Arriaga, Comillas University.
- Session 2: 10.30-11.30  
The reform of electricity trading in England and Wales. Arslan Erinmez, NGC.
- Session 3: 12.00-13.00  
The market design in California and the energy crisis. What was wrong? .  
Edward Kahn, Analysis Group.
- Session 4: 13.00-14.00  
The PJM pool electricity market. Main differences with California.  
Rajesh Rajaraman, Christensen Associates (instructor to be confirmed).
- Session 5: 15.30-16.30  
The Nordic market. Reasons for the success of the model. Torbjorn Sletten, Statnett.
- Session 6: 16.30-17.30  
The Spanish Power Market and conclusions. Ignacio Pérez-Arriaga, Comillas University.

## Conference Schedule

### ***Tuesday, June 25, 9.30-11.00***

Welcome and Opening Sessions

### ***Tuesday, June 25, 11.00-11.40***

Survey paper 1

RECENT TRENDS IN DISTRIBUTED GENERATION –TECHNOLOGY, GRID INTEGRATION,  
SYSTEM OPERATION

*Tatsumi Ichikawa, CRIEPI*

*Christian Rehtanz, ABB*

## **Tuesday, June 25, 12.00-14.00**

**Session name: Advanced Techniques, PS1**

**Chairperson: J. Giri**

HIERARCHICAL VISUALIZATION OF NETWORK CONGESTIONS

*Edmund Handschin, Jörg Brosda, Carsten Leder*

*Germany*

TURBINE VALVE CONTROL BASED ON ARTIFICIAL NEURAL NETWORKS

*Ramnarayan Patel, T.S. Bhatti, D.P. Kothari*

*India*

AN ADVANCED VISUALIZATION PLATFORM FOR REAL-TIME POWER SYSTEM OPERATIONS

*Ray Klump, David Schoole, Tom Overbye*

*USA*

EXPERIMENTAL PLATFORM FOR THE MODELING OF AN INFORMATION EMBEDDED POWER SYSTEM

*Stephen Carullo, Dr. Chika Nwankpa*

*USA*

FREQUENCY DETECTION METHOD BASED ON RECURSIVE DFT ALGORITHM

*Katsuyasu Nakano, Yutaka Ota, Hiroyuki Ukai, Koichi Nakamura, Hideki Fujita*

*Japan*

AN OVERVIEW OF WAVELET TRANSFORM APPLICATIONS IN POWER SYSTEMS

*Horacio Nelson Diaz Rojas, Rosa Ma. de Castro Fernandez*

*Chile*

## **Tuesday, June 25, 12.00-14.00**

**Session name: Advances in Small Signals Analysis, PS2**

**Chairperson: M. Pavella**

IMPROVEMENT OF STABLE TRANSFER CAPABILITY BETWEEN AREAS BY MEANS OF SVC'S OR Q-PSS

*Noel Janssens*

*Belgium*

ENHANCED MODAL BASED TECHNIQUE FOR CONSTRUCTION OF POWER SYSTEM DYNAMIC EQUIVALENTS

*Istvan Erlich, Peter Schegner, Zoltan Kasztel*

*Germany*

GENERALIZATION OF STEADY STATE STABILITY CRITERION FOR POWER SYSTEMS

*Vladimir Stroeov, Pavel Legkokonets, Evgeni Karasev*

*Russia*

A NEW METHOD FOR DETERMINING SUB-OPTIMAL LOCATIONS AND SYNCHRONOUS REACTANCES OF LOW-RESPONSE EXCITATION TYPE SUPERCONDUCTING GENERATORS FOR STABILITY ENHANCEMENT IN MULTI-MACHINE POWER SYSTEM

*Akihiko Yokoyama, Fumio Kawano, Tanzo Nitta*

*Japan*

THE U ANALYSIS METHOD FOR GENERATOR PARAMETER'S INFLUENCE ON POWER SYSTEM STABILITY

*ChengShan Wang, Yanbo Che*

*China*

POWER SYSTEM SMALL SIGNAL STABILITY ANALYSIS BASED ON TEST SIGNAL

*Zheng Xu, Wei Shao, Changchun Zhou*

*China*

## **Tuesday, June 25, 12.00-14.00**

**Session name: Faults, Protection & Control in Distribution Systems, PS3**

**Chairperson: J. Lopes**

A FUZZY INFERENCE SYSTEM TO VOLTAGE/VAR CONTROL IN DMS - DISTRIBUTION MANAGEMENT SYSTEMS

*Vladimiro Miranda, Patricia Calisto*

*Portugal*

CAPACITOR PLACEMENT IN UNBALANCED POWER SYSTEMS

*Pietro Varilone, Guido Carpinelli, Ali Abur*

*Italy, USA*

CUSTOMER VOLTAGE DENSITY FUNCTION IN DISTRIBUTION SYSTEM VOLTAGE MONITORING AND CONTROL

*Matti Lehtonen, Kristian Uusitalo, Mikko Jalonen*

*Finland*

EMERGENCY OPERATION BASED ON MULTI AGENT TECHNOLOGY IN FRIENDS

*Ryoichi Hara, Hiroyuki Kita, Eiichi Tanaka, Jun Hasegawa*

*Japan*

DIRECTIONAL PROTECTION FOR DISTRIBUTION FEEDERS WITH EMBEDDED GENERATIONS

*Haiyu Li*

*UK*

CURRENT, VOLTAGE AND FLUX ANALYSIS OF A DISTRIBUTION TRANSFORMER UNDER INTERNAL FAULT CONDITIONS

*Guzman Diaz, Arsenio Barbon, Javier Gomez-Aleixandre, JoseCoto  
Spain*

## **Tuesday, June 25, 12.00-14.00**

**Session name: Risk Management, PS4**

**Chairperson: A. Holen**

IDENTIFICATION OF PROBABILITY DISTRIBUTIONS OF PROBABILISTIC RELIABILITY INDICES  
FOR MONETARY EVALUATION AND RISK ASSESSMENT

*Michael Schwan, Wolfram H. Wellssow, Hans-Juergen Koglin  
Germany*

TESTING OF LARGE SCALE SYSTEMS WITH A NEW TOOL FOR INTEGRATED RISK  
MANAGEMENT

*Tarjei Kristiansen  
Norway*

AVAILABLE TRANSMISSION CAPACITY INFLUENCE ON ENERGY PORTFOLIO

*Jose Wanderley Lima, P. S. Quintanilha, A. C. Zambroni de Souza  
Brazil*

TRANSACTION SECURITY COST ANALYSIS BY TAKE-RISK STRATEGY

*Hong Chen, Claudio A. Canizares, Ajit Singh  
Canada*

PRICING ASPECTS OF CONTRACTS FOR DIFFERENCES

*Tarjei Kristiansen  
Norway*

SIMULTANEOUS OPTIMISATION OF WITHDRAWAL FROM A FLEXIBLE CONTRACT AND  
FINANCIAL HEDGING

*Birger Mo, Anders Gjelsvik  
Norway*

## **Tuesday, June 25, 16.00-18.00**

**Session name: Generation Optimization , PS5**

**Chairperson: H. Laffaye**

A MATHEMATICAL FRAMEWORK FOR UNIT COMMITMENT AND OPERATING RESERVE ASSESSMENT IN ELECTRIC POWER SYSTEMS

*Mahmud Fotuhi-Firuzabad, Roy Billinton*  
*Canada*

SEMIDEFINITE PROGRAMMING: A PRACTICAL APPLICATION TO HYDRO-THERMAL COORDINATION

*Rodrigo C. Fuentes Loyola, Victor H. Quintana*  
*Canada*

A NEW FUZZY UNIT COMMITMENT MODEL AND SOLUTION

*Abdel-aal Mantawy, Youssef Abdel-Magid*  
*Saudi Arabia*

DYNAMIC SECURITY DISPATCH UNDER PRACTICAL CONSTRAINTS

*Maria Dicorato, Enrico De Tuglie, Massimo La Scala, Pierangelo Scarpellini*  
*Italy*

A NEW METAHEURISTIC APPROACH TO THE UNIT COMMITMENT PROBLEM

*Ana Viana, Jorge Sousa, Manuel Matos*  
*Portugal*

BENDERS DECOMPOSITION FOR MIXED-INTEGERS HYDROTHERMAL PROBLEMS BY LAGRANGEAN RELAXATION

*Santiago Cerisola, Andres Ramos*  
*Spain*

## **Tuesday, June 25, 16.00-18.00**

**Session name: Dynamic Modelling, Simulation & Validation (I), PS6**

**Chairperson: D. Hill**

AGGREGATED MODELLING OF WIND PARKS WITH VARIABLE SPEED WIND TURBINES IN POWER SYSTEM DYNAMICS SIMULATIONS

*Han Slootweg, Sjoerd de Haan, Henk Polinder, Wil Kling*  
*The Netherlands*

IDENTIFICATION OF BRUSHLESS EXCITATION SYSTEM MODEL PARAMETERS AT DIFFERENT OPERATING CONDITIONS VIA FIELD TESTS

*Mohammad Rasouli, Mehdi Karrari*  
*Iran*

A DYNAMIC MODEL OF THE D-SMES DEVICE FOR POWER SYSTEM PERFORMANCE STUDIES

*Mikhail Borodulin, Yuriy Kazachkov, Timothy Laskowski, Michael Ross*  
*USA*

MODEL DERIVATION OF AN ADJUSTABLE SPEED GENERATOR AND ITS EXCITATION CONTROL SYSTEM

*Rion Takahashi, Junji Tamura, Yasuyuki Tada, Atsushi Kurita*  
*Japan*

INVESTIGATION OF THE DYNAMIC BEHAVIOUR OF HYDRO POWER PLANTS FOR NETWORK RESTORATION SCENARIOS

*Stefan Spreng, Harald Weber, Matthias Hladky*  
*Switzerland, Germany*

SOLVSIM POWER STATION - A NEW SAFE ALTERNATIVE FOR TESTING THE FREQUENCY CONTROL AND ISLAND OPERATION CAPABILITY OF POWER STATIONS

*Evert Agneholm, Niclas Krantz, Morgan Emanuelsson, Håkan Hermansson*  
*Sweden*

## **Tuesday, June 25, 16.00-18.00**

**Session name: Strategic Behaviour, PS7**

**Chairperson: F. Alvarado**

INFLUENCE OF ANN-BASED MARKET PRICE FORECASTING UNCERTAINTY ON OPTIMAL BIDDING

*Jose L. Martinez Ramos, Antonio Gomez Exposito, Jesus Riquelme Santos, Alicia Troncoso Lora, Agustin R. Marulanda Guerra*  
*Spain*

BIDDING IN A DAY-AHEAD ELECTRICITY MARKET: A COMPARISON OF DECOMPOSITION TECHNIQUES

*Alvaro Baillo, Mariano Ventosa, Michel Rivier, Andres Ramos, Gregorio Relano*  
*Spain*

STRATEGIC BIDDING FOR AN INDEPENDENT POWER PRODUCER IN A COMPETITIVE ENERGY MARKET WITH INTER-AREA CONSTRAINTS

*Maria Vittoria Cazzol, Angelo Garzillo, Mario Innorta*  
*Italy*

SUPERGAMES IN ELECTRICITY MARKETS: BEYOND THE NASH EQUILIBRIUM CONCEPT

*Pedro Correia, Thomas J. Overbye, Ian A. Hiskens*

*USA*

AN ITERATIVE ALGORITHM FOR PROFIT MAXIMIZATION BY MARKET EQUILIBRIUM CONSTRAINTS

*Andres Ramos, Mariano Ventosa, Michel Rivier, Abel Santamaria*

*Spain*

MARGINAL VS. PAY-AS-BID PRICING IN COMBINED POOL/BILATERAL ELECTRICITY MARKETS

*Ivana Kockar, Pablo Cuervo Franco, Francisco D. Galiana*

*Canada, Brasil*

## **Tuesday, June 25, 16.00-18.00**

**Session name: Fault Location & Protection Coordination, PS8**

**Chairperson: W. Wellssow**

PROTECTION SYSTEM COORDINATION - CONSIDERING NEW TECHNIQUES BY USING FLEXIBLE MODELS

*Carsten Boese, Thomas Weber, Michael Schwan, Wolfram H. Wellssow*

*Germany*

AN EXPERT SYSTEM FOR WIDE AREA BACK-UP PROTECTION: - LOCAL DRIVEN MECHANISM WITH REMOTE INFORMATION SHARING

*J C Tan, P A Crossley, P Gale, I. Hall, J Farrell*

*Canada, UK*

A NEW ACCURATE FAULT LOCATION METHOD USING ALPHA-BETA SPACE VECTOR ALGORITHM

*Luis Sousa Martins, Vitor Fernao Pires, Carlos Alegria*

*Portugal*

INTELLIGENT FAULT LOCATION AND DIAGNOSIS SYSTEM ON RADIAL DISTRIBUTION SYSTEMS

*Bo-Gun Jin, Bo-Gun Jin, Duck-Su Lee, Seung-Jae Lee, Sang-Hee Kang, Myeon-Song Choi, Bok-Shin Ahn, Nam-Sun Yoon, Ho-Yong Kim*

*Republic of Korea*

COMPUTATION OF THE EARTH FAULT DISTANCE IN COMPENSATED MV - NETWORKS BY EVALUATING STEADY STATE VALUES

*Gerit Eberl, Peter Schegner*

*Germany*

ACCURATE LOCATION OF FAULTS IN PARRALLEL TRANSMISSION LINES UNDER  
AVAILABILITY OF MEASUREMENTS FROM ONE CIRCUIT ONLY

*Jan Izykowski, Rafal Kawecki, Eugeniusz Rosolowski, Murari M. Saha*  
*Poland, Sweden*

## **Wednesday, June 26, 9.00-9.40**

### **Case study**

IBERIAN ELECTRICITY MARKET: A CASE STUDY

*Jorge Vasconcellos, Portuguese Electricity Regulation Authority*

## **Wednesday, June 26, 9.50-11.30**

**Session name: Computation Techniques, PS9**

**Chairperson: L. Wehenkel**

A PARAMETRIC SENSITIVITY FORMULATION FOR POWER SYSTEM ANALYSIS

*M. Shwehdi, Jubran Refaie*  
*Saudi Arabia*

LOOP FLOWS IN A RING AC POWER SYSTEM

*Noel Janssens, Amadou Kamagate*  
*Belgium*

NODAL RELIABILITY

*Davi Arentz, Marcus Schilling, Milton Brown, Julio Souza*  
*Brazil*

OBJECT ORIENTED SET THEORETIC IMPLEMENTATION OF MINIMUM DEGREE ALGORITHM

*Shubha Pandit, S. A. Soman, S. A. Khaparde*  
*India*

APPLICATION OF NEWTON METHODS AND PARALLEL PROCESSING TO THE SOLUTION OF  
ELECTRIC SYSTEMS

*Norberto Garcia, Enrique Acha, Aurelio Medina*  
*UK, Mexico*

## **Wednesday, June 26, 9.50-11.30**

**Session name: Dynamic Modelling, Simulation & Validation (II), PS10**

**Chairperson: N. Hadj Said**

THE INFLUENCE OF FACTS DEVICES ON SHORT-CIRCUIT BEHAVIOR

*Edmund Handschin, Christian Becker, Carsten Leder, Hendrik Neumann  
Germany*

TCR VERSUS VSI FOR RAILWAY LOAD BALANCING AND COMPENSATION. A CASE STUDY.

*Octavio M. Ruiz Garcia, Antonio Gomez Exposito  
Spain*

WAVELET ANALYSIS OF THE FAULT TRANSIENT PHENOMENA ON AN IMPROVED THYRISTOR CONTROLLED SERIES COMPENSATED TRANSMISSION LINE MODEL WITH PARTICULAR REFERENCE TO ACCURATE FAULT LOCATION

*W J Cheong, R K Aggarwal  
UK*

AN ADAPTIVE CONTROLLER FOR THE TCSC BASED ON THE IMMERSION AND INVARIANCE DESIGN TECHNIQUE

*Alessandro Astolfi, Gerardo Escobar, Romeo Ortega, Alex M. Stankovic  
UK, USA, France*

TRANSIENT STABILITY SIMULATION WITH EMBEDDED ELECTROMAGNETIC TRANSIENT SVC MODEL

*Ka Wing Chan, Laurence Snider, Renchang Dai, Boming Zhang  
Hong Kong, China*

## **Wednesday, June 26, 9.50-11.30**

**Session name: System Integration of Dispersed Generation, PS11**

**Chairperson: V. Miranda**

PROBABILISTIC OPTIMISATION OF MV DISTRIBUTION NETWORK IN PRESENCE OF DISTRIBUTED GENERATION

*Gianni Celli, Rocco Cicoria, Susanna Mocci, Fabrizio Pilo  
Italy*

OPTIMIZATION BASED ANALYSIS OF DISTRIBUTED GENERATION

*William Rosehart, Ed Nowicki  
Canada*

THREE PHASE POWER FLOW FOR DISTRIBUTION SYSTEMS WITH DISPERSED GENERATION

*Ali Abur, Harinderpal Singh, Haijun Liu, Wally Klingensmith*

*USA*

STANDARDIZED MODELS OF DISTRIBUTED ENERGY SOURCES FOR POWER NETWORK PLANNING USING NETOMAC

*Antje Orths, Andrzej Bachry, Zbigniew Styczynski, Olaf Ruhle, Wilhelm Winter*

*Germany*

COMPARATIVE ANALYSIS OF TRANSIENT OPERATION OF TWO DIFFERENT EMBEDDED GAS TURBINE POWER PLANTS

*Ian Chilvers, Jovica V. Milanovic*

*UK*

## **Wednesday, June 26, 9.50-11.30**

**Session name: Methods & Tools for Market Analysis, PS12**

**Chairperson: T. Overbye**

CROSS-BORDER TARIFICATION IN THE INTERNAL ELECTRICITY MARKET (IEM) OF THE EUROPEAN UNION

*Ignacio J.Perez-Arriaga*

*Spain*

AN OPTIMAL CONSTRAINT MANAGEMENT PROGRAM FOR NEW ELECTRICITY TRADING ARRANGEMENTS IN THE UK

*Fan Li, Martin Bradley, Matthew Gabb, Chris Aldridge, Chak Cheung, Richard Walker*

*UK*

FITTING ELECTRICITY MARKET MODELS. A CONJECTURAL VARIATIONS APPROACH

*Antonio Garcia-Alcalde, Mariano Ventosa, Michel Rivier, Andres Ramos, Gregorio Relano*

*Spain*

A DYNAMIC SIMULATION MODEL FOR LONG-TERM ANALYSIS OF THE POWER MARKET

*Audun Botterud, Magnus Korpas, Klaus-Ole Vogstad, Ivar Wangensteen*

*Norway*

CALCULATING THE START-UP COSTS OF HYDROPOWER GENERATORS

*Thor Bjorkvoll, Bjorn H. Bakken*

*Norway*

MODEL-BASED PROTOCOLS FOR THE CHANGING ELECTRIC POWER INDUSTRY

*Marija Ilic*

*USA*

## **Wednesday, June 26, 11.50-13.50**

**Session name: Reliability and Preventive Maintenance, PS13**

**Chairperson: A. Arcos**

EXTREME ADVERSE WEATHER MODELLING IN TRANSMISSION AND DISTRIBUTION SYSTEM RELIABILITY EVALUATION

*Roy Billinton, Chenjian Wu, Gagan Singh*

*Canada*

SURVEY OF CAUSES OF FAILURES BASED ON STATISTICS AND PRACTICE FOR IMPROVEMENTS OF PREVENTIVE MAINTENANCE PLANS

*Lina Bertling, Ron Allan, Roland Eriksson, Lars-Ake Gustafsson, Mats Ahlen*

*Sweden*

AN APPLICATION OF HYPOTHETICAL REASONING TO OUTAGE PLANNING FOR ELECTRIC POWER FACILITIES

*Koji Kawahara, Yoshifumi Zoka, Hiroshi Sasaki*

*Japan*

MODELING THE TRANSFORMER FREQUENCY RESPONSE TO DEVELOP ADVANCED MAINTENANCE TECHNIQUES

*Jorge Pleite, Emilio Olias, Andres Barrado, Antonio Lazaro, Juan Vazquez*

*Spain*

TRANSFORMER MONITORING: STATISTICAL SIMULATION TECHNIQUES AS AN INTELLIGENT ONLINE DATA PROCESSOR

*Sonia Natale, Alain Schenk, Alain Germond*

*Switzerland*

## **Wednesday, June 26, 11.50-13.50**

**Session name: New Methods for Small Signal Stability Analysis, PS14**

**Chairperson: C. Vournas**

POWER SYSTEM STABILIZER TUNING IN MULTIMACHINE POWER SYSTEM BASED ON A MINIMUM PHASE CONTROL METHOD AND GENETIC ALGORITHM

*Komsan Hongesombut, Yasunori Mitani, Kiichiro Tsuji*

*Japan*

DAMPING OSCILLATIONS IMPROVEMENT BY FUZZY POWER SYSTEM STABILIZERS TUNED BY GENETIC ALGORITHM

*Daniele Menniti, Alessandro Burgio, Anna Pinnarelli, Vittorio Principe, Nadia Scordino,*

*Nicola Sorrentino*

*Italy*

COORDINATED DESIGN OF POWER SYSTEM STABILIZERS AND FACTS BASED STABILIZERS  
USING GENETIC ALGORITHMS

*Mohammad Abido, Yousuf Abdel-Magid*  
Saudi Arabia

FEATURE REDUCTION FOR NEURAL NETWORK BASED SMALL-SIGNAL STABILITY  
ASSESSMENT

*Simon P. Teeuwsen, Istvan Erlich, Mohamed A. El-Sharkawi*  
Germany, USA

GENETIC ALGORITHM BASED TUNING OF PID POWER SYSTEM STABILIZERS

*Adrian Andreoiu, Kankar Bhattacharya*  
Sweden

IMPLEMENTATION AND REAL-TIME STUDIES WITH A SELF-LEARNING ADAPTIVE-NETWORK  
BASED FUZZY LOGIC PSS

*Ali Hariri, O.P.Malik*  
USA, Canada

## **Wednesday, June 26, 11.50-13.50**

**Session name: Demand & Supply Pricing, PS15**

**Chairperson: O. Fosso**

THE EFFECTIVENESS OF DEMAND ELASTICITY IN COMPETITIVE HYDROTHERMAL SYSTEMS

*Joao Carlos Aires, Luiz Augusto Barroso, Mario V.F. Pereira, Maria C. A. Lima, Priscila Lino*  
Brazil

MINIMUM CONSUMER PAYMENT SCHEDULING AND PRICING IN ELECTRICITY MARKETS

*Yongjun Ren, Francisco D. Galiana*  
Canada

MEASURING AND MODELLING OF INDUSTRIAL DEMAND RESPONSE TO ALTERNATIVE  
PRICES OF THE ELECTRICITY

*Jose M. Yusta, Jose A. Dominguez*  
Spain

RESOURCE SCHEDULING AND PRICING IN A CENTRALISED ENERGY MARKET

*Dilcemar Mendes*  
Brazil

PRICING ENERGY BACK UP CONTRACTS OF THERMAL PLANTS IN HYDROTHERMAL  
SYSTEMS

*Albert Melo, R. Torres, R. P. Caldas, M. E. Maceira, M.L.V. Lisboa, S. Ruffeil*  
Brazil

DAY-AHEAD PRICE FORECASTING IN ELECTRICITY MARKETS: A COMPARISON  
*Rosario Espinola, Javier Contreras, Francisco J. Nogales, Antonio J. Conejo*  
*Spain*

## **Wednesday, June 26, 11.50-13.50**

**Session name: Power Quality Monitoring and Disturbance Classification, PS16**

**Chairperson: J. Reynders**

POWER QUALITY ASSESSMENT USING TWO STAGE NONLINEAR ESTIMATION NUMERICAL ALGORITHM

*Vladimir Terzija, Vladimir Stanojevic, Martin Maximini Hans-Jürgen Koglin*  
*Germany, Yugoslavia*

MODELLING OF FLICKER PROPAGATION

*Thomas Keppler, Neville R. Watson, Jos Arrillaga*  
*New Zealand*

MEASUREMENT OF ENERGIES ASSOCIATED OF POWER QUALITY WITH UNBALANCED AND NONSINUSOIDAL VOLTAGES IN ELECTRIC POWER SYSTEMS.

*Joaquin Montaoana-Romeu, Vicente Leon-Martinez, Jose Giner-Garcia, Antonio Cazorla-Navarro*  
*Spain*

OPTIMAL GEOGRAPHICAL ALLOCATION OF POWER QUALITY CONTROL CENTERS BY VORONOI DIAGRAM

*Kennichi Akabane, Koichi Nara, Yuji Mishima, Kiichiro Tsuji*  
*Japan*

DIRECTIONAL METHOD FOR LOCATING SOURCES OF VOLTAGE SAGS/SWELLS

*Chuan Li Zhang, Shiun Chen, San Shing Choi*  
*Singapore*

AUTOMATED CLASSIFICATION OF POWER QUALITY EVENTS USING SPEECH RECOGNITION TECHNIQUES

*Heiko Englert, Juergen Stenzel*  
*Germany*

## **Wednesday, June 26, 15.20-17.20**

**Session name: Wide-Area Control, PS17**

**Chairperson: A. Bose**

WIDE AREA MEASUREMENT AND CONTROL SYSTEM FOR INCREASING TRANSMISSION CAPACITY IN DEREGULATED ENERGY MARKETS

*Christian Rehtanz, Dirk Westermann*

*Switzerland*

WIDE-AREA ADAPTIVE PROTECTION USING DISTRIBUTED CONTROL AND HIGH-SPEED COMMUNICATIONS

*Mark Damborg, S.S. Venkata, J. Huang, M. Kim*

*USA*

LOOP POWER FLOW CONTROL BY SERIES FACTS DEVICES FOR OPTIMAL POWER FLOW MANAGEMENT

*Fumitoshi Nakada, Yasunori Mitani, Osamu Saeki, Kiichiro Tsuji*

*Japan*

GLOBAL POWER SYSTEM CONTROL USING A UNIFIED POWER FLOW CONTROLLER

*Joseph Leung, David J. Hill, City University of Hong Kong, Yixin Ni, Ron Hui*

*Hong Kong*

STEADY STATE SECURITY ANALYSIS IN PRESENCE OF UPFC CORRECTIVE ACTIONS

*Daniele Menniti, Alessandro Burgio, Anna Pinnarelli, Vittorio Principe, Nadia Scordino,*

*Nicola Sorrentino*

*Italy*

AN INTELLIGENT ADAPTIVE LOAD SHEDDING SCHEME

*Vijay Vittal, Haibo You, Chen-Ching Liu, Juhwan Jung, Massoud Admin, Ram Adapa*

*USA*

## **Wednesday, June 26, 15.20-17.20**

**Session name: Controller Design, PS18**

**Chairperson: A. Yokoyama**

ROBUST DESIGN OF DAMPING CONTROLLERS IMPROVED BY PARTIAL FEEDBACK LINEARIZATION

*Rodrigo Andrade Ramos, Luis Fernando Costa Alberto, Newton Geraldo Bretas*

*Brazil*

BIFURCATION CONTROL FOR MITIGATING SUBSYNCHRONOUS OSCILLATIONS IN POWER SYSTEMS

*Ahmad Harb, Ali Nayfeh, Lamine Mili*

*Jordan, USA*

THE METHOD OF SMES CONTROL FOR IMPROVING TRANSIENT STABILITY OF ELECTRICAL POWER SYSTEMS

*Khaled Barghouthi, Dimitriy Nikitin*

*Russia*

CONTROL SYSTEM DESIGN OF ROTARY TYPE FREQUENCY CONVERTER STATION USING TWO SETS OF ADJUSTABLE SPEED GENERATOR/MOTOR FOR POWER INTERCHANGE AND POWER SYSTEM STABILIZATION

*Ryoji Kobayashi, Worawut Sae-Kok, Akihiko Yokoyama, Shigeaki Ogawa, S.C. Verma*

*Japan*

DESIGN OF AN INTERLINE POWER FLOW CONTROLLER

*Jianhong Chen, Tjing T. Lie , D.M. Vilathgamuwa*

*Singapore*

FACTS DEVICES CONTROLLED BY MEANS OF REINFORCEMENT LEARNING ALGORITHMS

*Damien Ernst, Louis Wehenkel*

*Belgium*

## **Wednesday, June 26, 15.20-17.20**

**Session name: Planning & Optimization of Distribution Systems, PS19**

**Chairperson: J.L. Martinez-Ramos**

A NEGOTIATION AID SYSTEM FOR THE DEVELOPMENT OF DISTRIBUTED RENEWABLE GENERATION

*Claudio Monteiro, Vladimiro Miranda, I. Ramirez Rosado*

*Portugal, Spain*

OPTIMAL POWER FLOW ALGORITHM BASED ON TABU SEARCH FOR MESHED DISTRIBUTION NETWORKS

*Jose Antonio Dominguez, Jose M. Yusta, Hussein M. Khodr*

*Spain, Venezuela*

EVALUATION OF RISK-BOUNDED DISTRIBUTION EXPANSION COSTS WITH A FUZZY DYNAMIC PROGRAMMING APPROACH

*Gustavo Schweikardt, Alberto Andreoni, Vladimiro Miranda*

*Argentina, Portugal*

OPTIMAL RADIALIZATION OF PRIMARY DISTRIBUTION NETWORKS WITH MULTICOST AND  
MULTIPOINT ALTERNATIVE SUPPLY

*Alberto Vargas , Omar Fajardo*  
*Argentina*

OPTIMAL CONFIGURATION OF NEW POWER DELIVERY SYSTEM FOR CUSTOMIZED POWER  
SUPPLY SERVICES

*Koichi Nara, Hirokazu Omi, Yuji Mishima*  
*Japan*

AN INTEGRATED APPROACH TO ADDRESS THE EXPANSION PLANNING PROBLEM OF  
DISTRIBUTION NETWORKS UNDER COMPETITION

*Teresa Ponce de Leao , Joao Tome Saraiva*  
*Portugal*

## **Wednesday, June 26, 15.20-17.20**

**Session name: Load Analysis and Forecasting, PS20**

**Chairperson: R. Cherkaoui**

A NOVEL STATE ESTIMATION MODEL FOR DISTRIBUTION SYSTEMS

*Matti Lehtonen, Mikko Jalonen, Arto Matsinen, Kristian Uusitalo, Jukka Kuru Vesa*  
*Haapamäki*  
*Finland*

SHORT-TERM LOAD FORECASTING FOR INDUSTRIAL CUSTOMERS USING FASART AND  
FASBACK NEURO-FUZZY SYSTEMS

*Domingo A. Gundin, Celiano Garcia, Yannis A. Dimitriadis, Eduardo Garcia, Guillermo Vega*  
*Spain*

MAPPING NEURAL NETWORKS INTO RULE SETS AND MAKING THEIR HIDDEN KNOWLEDGE  
EXPLICIT

*Vladimiro Miranda, Adriana Castro*  
*Portugal*

ON-LINE GRASP OF LOAD SYSTEM CONDITIONS WITH DISTRIBUTED GENERATORS BY USE  
OF SMES

*Yasuyuki Shirai, Shinji Takeda, Koichi Sato, Tanzo Nitta, Akira Uemura, Yoichiro Miyake,*  
*Hidetoshi Nishigaito*  
*Japan*

OBJECT ORIENTED ARCHITECTURE OF A LOAD COMPOSITION IDENTIFICATION SYSTEM AT  
DISTRIBUTION LEVEL

*Juan Alvaro Fuentes, A. Gabaldon, E. Gomez, A. Molina, F. Ruz*  
*Spain*

QUADRATIC PROGRAMMING FOR GRID SUPPLY POINT MW DEMAND COMPOSITION ANALYSIS

*Fan Li, Leon Walker*  
UK

## **Thursday, June 27, 9.00-9.40**

**Survey paper 2**

RELIABILITY IN THE LIBERALIZED ELECTRIC POWER MARKETS –FROM ANALYSIS TO RISK MANAGEMENT

*Chanan Singh, Texas A&M University*  
*Michael Schwan, Wolfram H. Wellssow, FGH*

## **Thursday, June 27, 9.50-11.30**

**Session name: Voltage Control, PS21**

**Chairperson: S. Corsi**

ASSESSMENT OF A TRANSMISSION AND DISTRIBUTION SYSTEM UNDER COORDINATED SECONDARY VOLTAGE CONTROL

*Flavio Lemos, Wilson Feijo Jr, Luis C. Werberich, Mauro A. da Rosa*  
Brazil

A CONTROL PROBLEM FOR DECENTRALIZED AUTONOMOUS VOLTAGE CONTROLLERS

*Naoto Yorino, Yoichiro Mori, Hiroshi Sasaki, Yoshifumi Zoka, Hiroaki Sugihara*  
Japan

A COORDINATED PROCEDURE TO CONTROL HOPF BIFURCATIONS VIA A SECONDARY VOLTAGE REGULATION SCHEME

*Andre Lerm, Alberto Berizzi*  
Brazil, Italy

SOLUTION OF DAILY VOLTAGE CONSTRAINTS IN THE SPANISH ELECTRICITY MARKET

*Enrique Lobato, Luis Rouco, Tomas Gomez, Francisco Echavarren, Marisa Navarrete, Rosa Casanova, Gerardo Lopez*  
Spain

NEW EVOLUTIONARY PARTICLE SWARM ALGORITHM (EPSO) APPLIED TO VOLTAGE/VAR CONTROL

*Vladimiro Miranda, Nuno Fonseca*  
Portugal

## **Thursday, June 27, 9.50-11.30**

**Session name: Nonlinear System Analysis & Control (I), PS22**

**Chairperson: C.C. Liu**

ASSESSMENT OF POWER SYSTEM GLOBAL STABILITY DETERMINED BY UNSTABLE LIMIT CYCLE

*Masayuki Watanabe, Yasunori Mitani, Kiichiro Tsuji*

*Japan*

STUDY ON POWER SYSTEM INSTABILITY AND CHAOS

*Yixin Yu, Hongjie Jia, Peng Li, Jifeng Su*

*China*

ASSESSMENT OF NONLINEAR MODAL INTERACTIONS IN STRESSED POWER SYSTEMS WITH FACTS CONTROLLERS

*Barocio Emilio, A R Messina*

*Mexico*

ADDRESSING NONLINEAR OBSERVABILITY ISSUES IN POWER SYSTEMS

*Chris Dafis, Chika Nwankpa*

*USA*

STATISTICAL OPTIMISATION OF A COMPLEX OF LOCAL DEVICES FOR PREVENTION OF OUT-OF-STEP CONDITIONS

*Antans Sauhats, Andrejs Svalovs*

*Latvia*

IDENTIFICATION OF OPTIMUM SITES FOR A POWER SYSTEM CONTROLLER USING NORMAL FORMS OF VECTOR FIELD

*Gilsoo Jang, Insoo Lee, Sae-Hyuk Kwon*

*Republic of Korea*

## **Thursday, June 27, 9.50-11.30**

**Session name: Congestion Management 1, PS23**

**Chairperson: T. Gomez**

COORDINATED AUCTIONING OF CROSS-BORDER CAPACITY : A COMPARISON

*R. Audouin, Dimitrios Chaniotis, Panagiota Tsamasphyrou, Jean-Marie Coulondre*

*France*

A METHODOLOGY FOR LOSS AND LINE FLOW ALLOCATION UNDER A POOL-BILATERAL MARKET

*Thelma S. Piazza Fernandes, Katia Campos de Almeida*

*Brazil*

COORDINATED CONGESTION MANAGEMENT OF CROSS-BORDER ELECTRICITY MARKETS

*Jose Aguado, Victor Quintana, Willian Rosehart, Marcelino Madrigal*  
*Spain, Canada*

ASSESSING THE TRANSMISSION TRANSFER CAPABILITY SENSITIVITY TO POWER SYSTEM PARAMETERS

*Paolo Marannino, Paola Bresesti, Antonella Garavaglia, Fabio Zanellini, Riccardo Vailati*  
*Italy*

ASPECTS OF THE GENERATION AND TRANSMISSION SERVICES IN THE PERUVIAN POWER SYSTEM UNDER DEREGULATION

*V. Leonardo Paucar, Marcos J. Rider*  
*Brazil*

## **Thursday, June 27, 9.50-11.30**

**Session name: Transmission Line Phenomena, PS24**

**Chairperson: C.A. Nucci**

THE APPLICATION OF NEC2 IN PREDICTING THE RADIATED FIELD FROM TRANSMISSION TOWER ARCING FAULTS

*Philip Moore, Hazri D M Razip, Vincent S G Chong*  
*UK*

OPTIMAL DESIGN OF ACTIVE SHIELDING FOR POWER LINES

*Pedro Cruz, Carlos Izquierdo, Manuel Burgos*  
*Spain*

IMPROVED SECONDARY ARC MODELS BASED ON IDENTIFICATION OF ARC PARAMETERS FROM STAGED FAULT TEST RECORDS

*Mustafa Kizilcay, Laszlo Prikler, Gabor Ban, Peter Handl*  
*Germany, Hungary*

STOCHASTIC PREDICTION OF VOLTAGE DIPS USING AN ELECTROMAGNETIC TRANSIENTS PROGRAM

*Juan A Martinez-Velasco, Jacinto Martin-Arnedo*  
*Spain*

A NEW METHOD TO IDENTIFY THE TYPE OF PARTIAL DISCHARGES

*Li Hongjie, S Birlasekaran, S S Choi, D. Lee, N. M. Vong*  
*Singapore*

## **Thursday, June 27, 11.50-13.50**

**Session name: System Reliability & Restoration, PS25**

**Chairperson: R. Billinton**

RELIABILITY ASSESSMENT OF MEDIUM VOLTAGE NETWORKS WITH SIMULATION OF THE RESTORATION PROCESS

*Marta Theil, Gerhard Theil*  
*Austria*

EVALUATING THE EFFECT OF PROTECTION SYSTEM ON RELIABILITY OF AUTOMATED DISTRIBUTION SYSTEM

*Ying He, Lennart Soder, Ron N. Allan*  
*Sweden, UK*

CONSIDERATION OF HIDDEN FAILURES IN SECURITY ANALYSIS

*Daniel Kirschen, Dusko Nedic*  
*UK*

A PROBABILISTIC MODEL FOR POWER QUALITY REGULATION BASED ON YARDSTICK COMPETITION BETWEEN DISTRIBUTION COMPANIES

*Jose M. Lopez-Sanchez, Tomas Gomez*  
*Spain*

DEFENSE PLAN DESIGN IN A LONGITUDINAL POWER SYSTEM

*Tsun-Yu Hsiao, Chan-Nan Lu, Yuin-Hong Liu*  
*Taiwan*

REMOTE BLACKSTART OF STEAM ELECTRIC STATION USING MODIFIED BARRIER-AUGMENTED LAGRANGIAN NONLINEAR OPTIMIZATION METHOD

*Mike Adibi, Igor Griva, Roman Polyak, Sami Ammari, Lamine Mili*  
*USA*

**Thursday, June 27, 11.50-13.50**

**Session name: Dynamic Modelling, PS26**

**Chairperson: G. Andersson**

A ZERO-REFLECTION CONTROLLER FOR ELECTROMECHANICAL DISTURBANCES IN POWER NETWORKS

*Bernard Lesieutre, Ernst Scholtz, George Verghese*  
*USA*

TIME DOMAIN MODELLING AND ANALYSIS OF A COUPLED DVR-STATCOM (UPFC) SYSTEM

*Norberto Garcia, Manuel Madrigal, Enrique Acha*  
*UK*

A STUDY OF THE EIGENVALUE ANALYSIS CAPABILITIES OF POWER SYSTEM DYNAMICS SIMULATION SOFTWARE

*Han Slootweg, Jonas Persson, Arjan van Voorden, Bob Paap, Wil Kling*  
*The Netherlands, Sweden*

PARAMETRIC ANALYSIS OF SHAFT TORQUE ESTIMATOR BASED ON OBSERVER  
*Tetsuro Kakinoki, Goro Fujita, Kaoru Koyanagi, Toshihisa Funabashi*  
*Japan*

SELECTING EQUIVALENT MODELS IN THE EXCITATION SYSTEM DYNAMIC AGGREGATION  
PROBLEM  
*Eduardo Pires de Souza, Maria Araujo Pedro, Fabio Souza*  
*Brazil*

VALIDITY OF A LINEAR MODEL OF A THYRISTOR-CONTROLLED SERIES CAPACITOR FOR  
DYNAMIC SIMULATIONS  
*Jonas Persson, Lennart Söder*  
*Sweden*

## **Thursday, June 27, 11.50-13.50**

**Session name: Congestion Management 2, PS27**

**Chairperson: J. Alba**

EFFECTIVENESS OF THE DISTRIBUTION FACTOR APPROXIMATIONS USED IN CONGESTION  
MODELING  
*Minghai Liu, George Gross*  
*USA*

DETERMINATION OF CONGESTION ZONES IN DEREGULATED ELECTRICITY MARKETS USING  
FUZZY CLUSTERING  
*Ying-Yi Hong, Chih-Nein Chang- Chien, Kuo-Lung Wu, Miin-Shen Yang*  
*Taiwan*

ON THE CHOICE OF SLACK BUS IN MECHANISMS FOR TRANSMISSION NETWORK COST  
ALLOCATION THAT ARE BASED ON NETWORK UTILIZATION  
*Carlos Vazquez, Luis Olmos, Ignacio J. Perez-Arriaga*  
*Spain*

A DYNAMIC APPROACH FOR TRANSMISSION MANAGEMENT THROUGH A CONTRACT  
CURTAILMENT STRATEGY  
*Sergio Bruno, Massimo La Scala, Pierangelo Scarpellini, Giuliano Vimercati*  
*Italy*

MARGINAL AND TRACING PRICING OF TRANSMISSION: AN EMPIRICAL COMPARISON  
*Ahmed Al-Rajhi, Janusz Bialek*

*Saudi Arabia, UK*

INTERRUPTIBLE LOAD SERVICES FOR TRANSMISSION CONGESTION RELIEF  
*Tuan Le Anh, Kankar Bhattacharya*  
*Sweden*

## **Thursday, June 27, 11.50-13.50**

**Session name: Harmonic Modelling of Networks and Filter Design, PS28**  
**Chairperson: S.S. Choi**

HARMONIC MODELLING OF NETWORKS CONTAINING LINE-COMMUTATED VOLTAGE-SOURCED CONVERTERS  
*Graeme Bathurst, Neville R. Watson, Jos Arrillaga*  
*New Zealand*

HARMONIC DECOMPOSITION OF FAULT DISTURBANCES USING THE LS PRONY AND ESPRIT-BASED METHODS  
*Chris Dafis, Chika Nwankpa, Athina Petropulu*  
*USA*

MODERN SPECTRAL ANALYSIS OF NON-STATIONARY SIGNALS IN ELECTRICAL POWER SYSTEMS  
*Tadeusz Lobos, Zbigniew Leonowicz, Peter Schegner*  
*Poland, Germany*

COMPUTATION OF INDIVIDUAL HARMONICS IN DIGITAL RELAYING  
*Jose Antonio Rosendo, Antonio Gomez*  
*Spain*

OPTIMAL DESIGN OF TUNED PASSIVE FILTERS  
*Jose Maria Maza Ortega, Manuel Burgos, Carlos Izquierdo Mitchell*  
*Spain*

A NEW ACTIVE POWER LINE CONDITIONER FOR COMPENSATION IN UNBALANCED/DISTORTED ELECTRICAL POWER SYSTEMS  
*Jesus R. Vazquez, Patricio Salmeron, F. Javier Alcantara, Jaime Prieto*  
*Spain*

## **Thursday, June 27, 15.20-17.20**

**Session name: ATC Calculation & Dispatch Including Dynamic Aspects, PS30**

**Chairperson: C. Cañizares**

A NEW CALCULATION METHOD OF TOTAL TRANSMISSION CAPACITY (TTC) TAKING INTO ACCOUNT VARIOUS KINDS OF STABILITY

*Akihiko Yokoyama, Shigeaki Fujiwara*

*Japan*

TRANSFER CAPABILITY COMPUTATION OF POWER SYSTEMS WITH COMPREHENSIVE MODELLING OF FACTS CONTROLLERS

*Xiao-Ping Zhang (University of Warwick), Edmund Handschin (University of Dortmund, Germany)*

*UK, Germany*

RAISING STABILITY LIMITS IN THE NORDIC POWER TRANSMISSION SYSTEM

*Kjetil Uhlen, Magni Palsson, Tor Rolv Time, Øystein Kirkeluten, Jan Ove Gjerde*

*Norway*

ENHANCEMENT OF INTERFACE TRANSFER LIMITS IN TERMS OF VOLTAGE STABILITY USING REACTIVE RESERVE BASED CONTINGENCY CONSTRAINED OPTIMAL POWER FLOW

*Hwachang Song, Byongjun Lee, Sae-Hyuk Kwon, Venkatarama Ajjarapu*

*Republic of Korea, USA*

TRANSMISSION SYSTEM TAP CHANGER SETTINGS TO MAXIMIZE LOADABILITY MARGIN

*Costas Vournas, Michael E. Karystianos*

*Greece*

COMBINING PRODUCTION AND TRANSMISSION SYSTEM USING RELAXED CONSTRAINTS

*Michael Martin Belsnes, Olav Bjarte Fosso, Geir Warland*

*Norway*

## **Thursday, June 27, 15.20-17.20**

**Session name: Operation and Control of Alternative Generation Systems, PS31**

**Chairperson: L. Söder**

INTELLIGENT CONTROL IN BIOMASS-BASED WIND-DIESEL SYSTEMS

*Francisco Jurado, Jose Saenz*

*Spain*

A GENERAL APPROACH FOR SECURITY MONITORING AND PREVENTIVE CONTROL OF NETWORKS WITH LARGE WIND POWER PRODUCTION

*Helena Vasconcelos, Jose Nuno Fidalgo, Joao Pecas Lopes*  
Portugal

CONTROL FUNCTIONS FOR SECURE OPERATION OF ISOLATED POWER SYSTEMS

*Nikos Hatziaargyriou, Joao Abel Pecas Lopes, Manuel Matos*  
Greece

SIMULATING ELECTRICAL PERFORMANCE OF STATIONARY FUEL CELLS FOR DISPERSED GENERATION

*Dirk Audring, Gerd Balzer*  
Germany

INFLUENCE ON LOW VOLTAGE DISTRIBUTION NETWORKS WITH A LARGE NUMBER OF LOCAL FUEL CELL COMBINED HEAT AND POWER PLANTS

*Rudolf Friedrich, Hans-Jürgen Koglin*  
Germany

OPERATION AND SIZING OF ENERGY STORAGE FOR WIND POWER PLANTS IN A MARKET SYSTEM

*Magnus Korpas, Ragne Hildrum, Arne T. Holen*  
Norway

## **Thursday, June 27, 15.20-17.20**

**Session name: Numerical Techniques, PS32**

**Chairperson: J. Marti**

ON INTERPOLATION AND REINITIALIZATION IN THE SIMULATION OF TRANSIENTS IN POWER ELECTRONIC SYSTEMS

*Ming Zou, Jean Mahseredjian, Benoit Delourme, Geza Joos*  
Canada

A RESYNCHRONIZATION ALGORITHM FOR TOPOLOGICAL CHANGES IN REAL TIME FAST TRANSIENTS SIMULATION

*Luis Linares, Jose R. Marti*  
Canada

EXTENDING EMTP FOR SIMULATING AGENT BASED DISTRIBUTED APPLICATIONS

*Mesut Baran, Raghuram Sreenath, Nikhil R Mahajan*  
USA

A CIRCUIT APPROACH FOR THE COMPUTER MODELLING OF CONTROL TRANSFER FUNCTIONS

*Benedito Donizeti Bonatto, Hermann W. Dommel*  
Canada

AN APPROACH TO EVALUATING ACCURACY OF NUMERICAL INTEGRATION IN SIMULATION OF LINEAR NETWORK TRANSIENTS

*Mikhail Borodulin*  
USA

## **Thursday, June 27, 17.40-19.00**

**Session name: Simulation, PS33**

**Chairperson: M.P. Bongrain**

A COMPONENT BASED APPROACH TO POWER SYSTEM APPLICATIONS DEVELOPMENT

*Izudin Dzafic, Fernando L. Alvarado, Mevludin Glavic, Sejid Tesnjak*  
Bosnia and Herzegovina, USA, Belgium, Croatia

DISTRIBUTED SIMULATION OF ELECTRIC POWER SYSTEMS

*Juri Jatskevich, O. Wasynczuk, N. Mohd Noor, E. A. Walters, E. C. Lucas, P. T. Lamm*  
USA

ANALYTIC SUBSYSTEM FORMULATION FOR THE EFFICIENT SIMULATION OF ELECTRIC POWER SYSTEMS

*Lutz Hofmann, B. R. Oswald*  
Germany

OVNI: INTEGRATED SOFTWARE/HARDWARE SOLUTION FOR REAL-TIME SIMULATION OF LARGE POWER SYSTEMS

*Jose Marti, Luis R. Linares, Jorge A. Hollman*  
Canada

## **Thursday, June 27, 17.40-19.00**

**Session name: Transmission Line Transients, PS35**

**Chairperson: H. Dommel**

RESONANCE EFFECTS DUE TO CONDUCTOR TRANSPOSITION IN THREE-PHASE POWER LINES

*Jose Brandao Faria, Manuel Guerreiro das Neves*  
Portugal

SWITCHING TRANSIENTS ON LONG TRANSMISSION LINES WITH TAPPED TRANSFORMERS

*Liliana Oprea, Victor Popescu*

*Germany*

LINE MODEL IN THE TIME DOMAIN CONSIDERING FREQUENCY DEPENDENT PARAMETERS,  
LEAKANCE AND CORONA

*Lutz Hofmann, B. R. Oswald*

*Germany*

INCREASING THE CAPACITY OF LONG EHV TRANSMISSION LINES BY SATURATED  
REACTORS

*Manoel Carvalho, Magnata da Fonte*

*Brazil*

## **Friday, June 28, 9.00-10.45**

**Session name: State Estimation, PS37**

**Chairperson: P. Marannino**

A NONPARAMETRIC TECHNIQUE FOR HIGH PRECISION ESTIMATION OF POWER SYSTEM  
TIME-VARYING PHASORS

*Rastko Zivanovic*

*South Africa*

A NEW APPROACH FOR CIRCUIT BREAKER STATUS IDENTIFICATION IN GENERALIZED STATE  
ESTIMATION

*George Korres, Petros Katsikas*

*Greece*

OPTIMAL POWER FLOW APPLIED TO STATE ESTIMATION ENHANCEMENT

*Mathieu Dancre, Pascal Tournebise, Patrick Panciatici, Fabrice Zaoui*

*France*

GEOMETRICALLY-BASED HYPOTHESIS TESTING FOR TOPOLOGY ERROR IDENTIFICATION

*Elizete M. Lourenco, Kevin A. Clements, Antonio J. A. Simoes Costa*

*Brazil*

FUZZY CONTROL OF STATE ESTIMATION ROBUSTNESS

*Jorge Pereira, Vladimiro Miranda, J. Tome Saraiva*

*Portugal*

## **Friday, June 28, 9.00-10.45**

**Session name: Voltage Stability, PS38**

**Chairperson: T. Van Cutsem**

IMPACT OF INDUCTION MOTORS LOADS INTO VOLTAGE STABILITY MARGINS OF LARGE SYSTEMS

*Ricardo Henriques, Nelson Martins, Julio C. R. Ferraz, Antonio C. B. Martins, Herminio J. C. P. Pinto, Sandoval Carneiro Jr*  
*Brazil*

A COMPARISON OF POWER FLOW, FULL AND FAST DYNAMIC SIMULATIONS

*Alessandro Manzoni, Glauco N. Taranto, Djalma M. Falcao*  
*Brazil*

ESTIMATION OF DISTANCE TO VOLTAGE COLLAPSE: TESTING AN ALGORITHM BASED ON LOCAL MEASUREMENTS

*Leif Warland, Arne T. Holen*  
*Norway*

COMPOSITE LOAD SENSITIVITY IN VOLTAGE STABILITY PROBLEM SOLVED BY UNIFIED POWER FLOW CONTROLLER

*Nijaz Dizdarevic, Sejid Tesnjak, Goeran Andersson*  
*Croatia, Switzerland*

AN ESTIMATION OF LOAD POWER MARGINS FOR BRANCH OUTAGE CONTINGENCIES

*Naoto Yorino, Shigemi Harada, Huanqiang Li, Hiroshi Sasaki*  
*Japan*

## **Friday, June 28, 9.00-10.45**

**Session name: Nonlinear System Analysis & Control (II), PS39**

**Chairperson: V. Stroeve**

WIDE-AREA MEASUREMENTS FOR POWER SYSTEM OSCILLATIONS AND FACTS INTERACTIONS.

*Kerim MEKKI, Nouredine Hadjsaid, Didier Georges, Rene Feuillet, Arun G. Phadke, Felix F. Wu*  
*France, USA, Hong Kong*

AN APPROACH TO ON-LINE ASSESSMENT OF POWER SYSTEM DAMPING

*Daniel Ruiz-Vega, Arturo R. Messina, Mania Pavella*  
*Belgium, Mexico*

INVESTIGATION OF THE OPTIMUM LINE RECLOSING TIME FOR DAMPING INTERAREA OSCILLATIONS

*Ka Wing Chan, Guowei Cai, Gang Mu  
Hong Kong, China*

EXTENDED LYAPUNOV FUNCTION FOR DETAILED POWER SYSTEM MODELS

*Luis Alberto , Flavio Silva, Newton Bretas  
Brazil*

COMPUTATION OF CRITICAL VALUES OF PARAMETERS IN POWER SYSTEMS USING TRAJECTORY SENSITIVITIES

*Tony Nguyen, M. A. Pai, I. A. Hiskens  
USA*

A BCU-GUIDED TIME-DOMAIN METHOD FOR ENERGY MARGIN CALCULATION OF PRACTICAL POWER SYSTEMS

*Chiang Hsiao-Dong, Yasuyuki Tada, Hiroshi Okamoto, Yicheng Zhou, Kaoru Koyanagi  
USA, Japan*

## **Friday, June 28, 9.00-10.45**

**Session name: Service Markets, PS40**

**Chairperson: D. Kirschen**

COMPETITIVE ELECTRICITY MARKET FOR SECONDS SPINNING RESERVE EVALUATING THE SYSTEM DYNAMIC BEHAVIOR

*Rolando A. Castillo, Alberto Vargas  
Argentina*

AUTOMATIC GENERATION CONTROL IN COMPETITIVE ENVIRONMENTS: MODIFIED AGC FUNCTION

*Luis Malumbres, Vicente Comas, , Rodolfo Martinez, Luis Aguilo, Ricardo Hoya  
Spain*

AN EFFICIENT PROCEDURE FOR THE RATIONAL BUYER APPROACH FOR THE ACQUISITION OF CAPACITY-BASED ANCILLARY SERVICES

*Gianfranco Chicco, George Gross  
Italy, USA*

A NEW SCHEME FOR VOLTAGE CONTROL IN A COMPETITIVE ANCILLARY SERVICE MARKET

*Emilia Nobile, Anjan Bose  
USA*

VALUE OF VAR SUPPORT IN A COMPETITIVE ENVIRONMENT

*Danny Pudjianto, Goran Strbac, Keith Bell, Peter Turner*

*UK*

## **Friday, June 28, 11.00-12.30**

**Session name: Optimization Techniques, PS41**

**Chairperson: N. Janssens**

A JACOBIAN SMOOTHING NONLINEAR COMPLEMENTARITY METHOD FOR SOLVING OPTIMAL POWER FLOWS

*Geraldo Torres, Victor Quintana*

*Brazil, Canada*

A NOVEL MULTIOBJECTIVE EVOLUTIONARY ALGORITHM FOR SOLVING ENVIRONMENTAL/ECONOMIC POWER DISPATCH PROBLEM

*Mohammad Abido*

*Saudi Arabia*

EVALUATING BOUNDS ON VOLTAGE AND THERMAL SECURITY MARGINS UNDER POWER TRANSFER UNCERTAINTY

*Florin Capitanescu, Thierry Van Cutsem*

*Belgium*

ALTERNATIVE OPTIMAL POWER FLOW FORMULATIONS

*William Rosehart, Jose A. Aguado*

*Canada, Spain*

OPTIMAL OUTAGE SCHEDULING - EXAMPLE OF APPLICATION TO A LARGE POWER SYSTEM

*George Anders, Goma Hamoud, Armando Leite da Silva, Luiz A. da Fonseca Manso*

*Canada, Brazil*

## **Friday, June 28, 11.00-12.30**

**Session name: Protection Relay Algorithms, PS42**

**Chairperson: P. Schegner**

ANALYSIS OF NOISY VOLTAGE SIGNAL WITH A HIGH RESOLUTION OF FREQUENCY FOR THE CLOSING OF TRANSMISSION LINES

*Georg Pilz, Peter Schegner, Christian Wallner*

*Germany*

A NEW APPROACH TO FAST DETECTION OF INRUSH CURRENT BASED ON TRANSFORMER  
MAGNETIZING CHARACTERISTICS

*Masashi Kitayama, Miyuki Nakabayashi*  
Japan

OPTIMIZING PERFORMANCE OF A TRANSMISSION LINE RELAYING ALGORITHM IMPLEMENTED  
USING AN ADAPTIVE, SELF-ORGANIZED NEURAL NETWORK

*Slavko Vasilic, Mladen Kezunovic, Dejan Sobajic*  
USA

A COMPARISON BETWEEN DISTANCE PROTECTION AND DIFFERENTIAL PROTECTION  
WITHOUT SYNCHRONISATION OF MULTI-TERMINAL LINES

*Michael Albert, Hans-Jürgen Koglin, Michael Igel*  
Germany

## **Friday, June 28, 11.00-12.30**

**Session name: Planning & Operations, PS43**

**Chairperson: J. Alonso**

CHAIN OF OPTIMIZATION MODELS FOR SETTING THE ENERGY DISPATCH AND SPOT PRICE  
IN THE BRAZILIAN SYSTEM

*Maria Elvira Maceira, Leslie A. Terry, Jorge M. Damazio, Fernanda S. Costa, Albert C. G. de  
Melo*  
Brazil

OPTIMAL LOCATION OF PHASE SHIFTERS IN A COMPETITIVE MARKET BY MIXED INTEGER  
LINEAR PROGRAMMING

*Flavio Lima, Jorge Munoz, Ivana Kockar, Francisco D. Galiana*  
Brazil, Canada

ELECTRIC POWER SYSTEM EXPANSION PLANNING IN MARKET ENVIRONMENT: GAME-  
THEORETICAL APPROACH

*Ekaterina Ivanova, Nikolai Voropai, Antje Orths, Zbigniew Styczynski*  
Russia, Germany

EXPANSION PLANING IN ELECTRICITY MARKETS: TWO DIFFERENT APPROACHES

*Mariano Ventosa, Rafael Denis, Carlos Redondo*  
Spain

POSSIBLE DESIGN OF THE BRAZILIAN ANCILLARY SERVICE MARKET FOR GENERATION  
RESERVES NEW TITLE: PROVISION OF GENERATION RESERVES AS AN ANCILLARY SERVICE  
IN THE BRAZILIAN SYSTEM

*Ricardo B. Prada, Carlos J. Velasco, Leonardo X. da Silva, Albert C.G. de Melo*  
Brazil

## **Friday, June 28, 12.30-13.50**

### **Pannel Session**

**Chairperson: Anjan Bose, Washington State University**

NEW EMS TOOLS AND CHALLENGES FOR OPERATING THE RESTRUCTURED POWER GRID

*Jay Giri, Alstom*

*Arnaud Hertz, RTE*

*Khosrow Moslehi, ABB*

*Nisheeth Singh, ETRANS*

## **Social Programme**

Conference participants and accompanying persons are cordially invited to this program which is included in the full registration fee. The program has three main events.

### **Welcome Reception**

Tuesday, June 25.

All attendees are cordially invited to the informal reception, that will take place at the conference venue. It will begin with a flamenco show, followed by a welcome cocktail. Although it was preliminarily announced that this reception would take place at the Reales Alcázares, this initial plan has been cancelled. This is a consequence of the end-of-semester European Council Summit taking place in Sevilla, on June 21-22. This major and unique event, attracting several thousand people, has significantly modified the agenda of many public institutions, including Reales Alcázares, the King's residence when he visits the city. However, attendees will be given the opportunity to visit the Reales Alcázares on Friday afternoon at no cost. See last item for more details.

### **Country Excursion**

Wednesday, June 26.

Excursion to "Cortijo de Arenales".

The Cortijo de Arenales, situated close to the town of Morón de la Frontera, 40 kilometres away from Sevilla, is a perfect example of the way of life in Andalusia. This Cortijo belongs to the Count de la Maza and it blends together traditional agricultural and cattle breeding process with the possibility of carrying out leisure activities, congresses, incentives or parties within the unique setting of the Sevillian landscape.

A visit to the Cortijo de Arenales offers the unequal opportunity of contemplating the fascinating and complex process of the breeding and selection of brave, fighting bulls. In addition to this, it is also an ideal setting to learn about all that surrounds the most traditional crops in the region like wheat, sun flowers and olive trees because of its 3000 Has, 2400 are

farming land and the rest are dedicated to the breeding of bulls, horses or are set aside for bunting.

In Arenales leisure activities are carried out in order to show visitors the day to day life within a fully functioning cortijo. And the purpose is not simply dissemination because these activities have fostered the preservation of traditions which were in danger of disappearing like the use of typical horse bareness, donkey breeding and certain aspects related to hunting.

For this trip it is advisable to wear comfortable clothing.

## Banquet Dinner

Thursday, June 27.

The banquet dinner will be sponsored by ENDESA, the major utility in Spain.

## Complimentary Visit to Reales Alcázares

Important note: This visit will begin at 6 pm on Friday (it is advisable to arrive 15' in advance, as the door will be closed at 6:05). In order to arrange the guided groups in due time, people interested in this visit are kindly asked to contact the Conference Secretariat at the registration desk, no later than Thursday 27 at 10 pm. Note that no bus service will be provided for this late visit, as the official conference programme ends at about 2 pm on Friday.

The Alcazar is not only an Arabic monument, it is a complex world of civilisations which have left their print on Seville. Here they successively built part of the Roman acropolis, a paleochristian basilica, Visigothic constructions, a defensive Arabic castle, the first castle, the work of Syrian craftsmen and the citadel of the 11th century which belonged to the abasies dynasty.

The charm of the Alcazar is disparate; from *el patio de las Doncellas* and *el patio de las Muñecas* which are extremely pretty and are delicately decorated, to the Ambassadors halls, the buildings most spectacular piece and the Princes's Hall with 16th century craftsmanship which was touched up in the 19th century and the Admiral's Hall of Carlos V, where there is a valued collection of 18th century tapestry and in which the Emperor's wedding with Isabel of Portugal was celebrated.

The history of the Alcazar is united to tragic and festive moments, it is here that San Fernando, the conqueror of Sevilla died; Isabel the Catholic gave birth to her only son; they finalised the details for Alfonso XII's wedding with his cousin María de las Mercedes.

## Accompanying Persons Programme

The following events may be booked for participants and/or accompanying persons in the reservation form. The tours are based on a minimum number of participants. If you are interested in other tours and sightseeing on individual basis, the Secretariat will be happy to help.

## ***Half Day Carmona***

Tuesday, June 25.

This visit starts visiting the ruins of the Alcázar del Rey Don Pedro, dominating the town. Formerly was the of the king Pedro I, known as Pedro the Cruel. Parts of it now form a parador. After the Alcázar, we will admire the Cordoba Gate, a beautiful entrance to the town, of roman origin.

The walking tour to discover the historic city, plenty of churches, palaces and convents, beginning with the Church of Santa María la Mayor, built in the 15th century in the site of an old mosque, whose patio still survives. This is the finest of Carmona's churches.

The Plaza de San Fernando has a feeling of grandeur which is characterized by the Renaissance façade of the old Town Hall. The present Town Hall, set just off the square, dates from the 18th century; in its courtyard are some Roman mosaics.

Afterwards, we visit the Fortress of the Gate of Seville, which remains have been found dating from the 14th to the 12th centuries BC. It was, in Roman times, between the 3rd century and the early 1st century BC, that it began to acquire a semblance of the way it looks today.

The tour concludes with the visit of the Necropolis. The most commonly used ceremony was cremation, and in the necropolis we can observe the collective mausoleum ( which is the most common type of burial ground), as well as the famous tomb of the elephant (a sanctuary dedicated to the Gods Cybele and Attis), and the tomb of Sevilla (which is the most impressive of all and stands out considerably from the rest of the structures found at the Necropolis).

## ***Panoramic Sightseeing***

Wednesday, June 26.

Panoramic tour of the modern infrastructure and architecture created for the Universal Exposition of 1992 in the Cartuja Island. The Barqueta Bridge, the Alamillo Bridge and several pavillions are a sample of that. The Chaterhouse of Santa María de las Cuevas is a monastery built in 1519.

Continue on to the famous the Park of María Luisa, which belonged to the princess Luisa Fernanda de Orleans, who donated the park to the city. It was landscaped by Jean Forestier, director of the Bois de Boulogne in Paris. The park contains the Plaza de España, historic in style, built by Anibal González out of brick and ceramics.

At the southern end of the park stand the Plaza de América, consisting in three buildings also designed by Anibal González for the 1929 Exhibition : The Royal Pavilion, of neo-gothic style, the Mudejar Pavilion which contains the Museum of Art and Popular Traditions ), and the Plateresque pavilion (today the Archaeological Museum).

The tour concludes with a walk by the Quarter of Santa Cruz, an old jewish neighbourhood. This quarter contains a large number of typical popular buildings protected with iron gates which open onto patios profusely decorated with flowers. We will discover the enchantement of its narrow streets, mysterious small squares that are full of orange trees.

## ***Hidden Sevilla***

Thursday, June 27.

The tour visits the Basilica de la Macarena, which was built in 1949 in the neo-baroque style by Gómez Millán as a new home for the much-loved Virgen de la Macarena. The imagen of the Virgin has been attributed to Luisa Roldán (1656-1703), the most talented female artist of the Seville School.

Afterwards, the visit continues on to the Convent of Santa Paula. Was founded in 1475, and still a working convent and home to 40 nuns. We will visit the museum, which consists of two galleries filled with religious artifacts and paintings, and buy jams and marmalades, made by the nuns.

The tour concludes with the visit of the Hospital de la Caridad. This is one of the most important monuments in Seville representing the splendour of Sevillian baroque style. It was originally built in the 15th century, and in the 17th century the sevillian aristocrat Miguel de Mañara entered this institution as chief of the brotherhood. We will admire the pictures of Valdes Leal and Murillo (the best artists of the second half of the 17th century).

## ***Full Day Córdoba***

Friday, June 28.

This tour includes a visit to the Cathedral/Mosque, which is the largest and only one of its kind in Europe. It comprises a lavish mosque in which a cathedral of Gothic, Baroque and Plateresque elements has been built. Inside the mosque a forest of about 850 columns makes for a repetitive motif of crisscrossing alleys not unlike the effect of a hall of mirrors.

Afterwards, we will continue on to the Jewish Quarter (with narrow streets and shady patios). On it we can admire the Sinagogue, and not very far the Alcázar of the Christian Kings (with beautiful gardens and a collection of marvellous Roman mosaics).

The tour continues on with the visit to the Maimonides statue, and the remains of the Arabs Baths. The visit will finish with a walk to Calleja de las Flores.

## ***Full day Granada and Capilla Real***

Saturday or Sunday, June 29 or 30.

The tour starts with the visit of the Alhambra, which complex includes the Royal Houses, the Alcazaba, the Palace of Carlos V and the Generalife Gardens. A magical use of space, light, water and decoration characterizes this most sensual piece of architecture. It was built under the Nasrid dynasty ruled Granada, and they created their idea of Paradise on Earth. Modest materials were used, but they were superbly worked. Although the Alhambra suffered pillage and decay, including an attempt by Napoleon's troops to blow it up, in recent times it has undergone extensive restoration and its delicate craftsmanship still dazzles the eye. The visitant will discover the different halls, like the Salón de Embajadores, Sala de los Reyes, Sala de los Abencerrajes, etc as well as the famous patios.

From the Alhambra's northern side, a footpath leads to the Generalife, the country state of the Nasrid kings. The gardens, began in the 13th century, have been modified over the years. The name has various interpretations, perhaps the most pleasing being "the garden of lofty paradise". Afterwards, the visit continues on to the Cathedral, began in 1523 by the architect Enrique de Egas. It continued under the Renaissance maestro, Diego de Siloe, who also designed the façade and the magnificent, circular Capilla Mayor. The west front was designed by the Baroque artist Alonso Cano, who was born in the city. His grave and many of his works can be seen in the cathedral.

Following the Cathedral we will visit the Royal Chapel, which was built for the Catholic Monarchs between 1506 and 1521 by Enrique de Egas. A magnificent reja (grille) encloses the high altar and the Carrara marble figures of Fernando and Isabel, their daughter Juana la Loca (the Mad) and her husband Felipe el Hermoso (the Fair).

## ***Half Day Jerez***

Jerez is the capital of sherry production, and the city is also famous for its horses, so our tour starts with the visit of the Royal Andalusian School of Equestrian Art, which was founded with the firm objective of selecting breeding and improving the Andalusian breed of horses. The school offers the Show "The Amazing Dancing Andalusian Horses", an unique show of equestrian art, based on rhythm and discipline, music and beauty.

Afterwards, the tour visits one of its famous wineries, which have become an extremely important part of the city. We can observe the fermentation of the wine, known as "crianza".

Tour only possible on tuesdays and thursdays.

# **Registration Information**

All meeting attendees are required to register.

## ***Participants***

Full registration fee includes attendance to technical and plenary sessions (except Tutorial), a CD with the full contents of the proceedings, coffee breaks, 3 lunches, attendance to the social events.

## ***Students***

The registration fee includes attendance to technical and plenary sessions (except for the Tutorial), a CD with the full contents of the proceedings, coffee breaks, and attendance to the welcome cocktail.

## ***Accompanying persons***

The registration fee includes access to the welcome cocktail, excursion to Cortijo de Los Arenales and a ticket to the banquet dinner.

## ***Tutorial***

Note that there is a separate fee for the tutorial.

The fee includes admittance to the tutorial, access to the course material, lunch and coffees.

## ***On-site registration***

Registration forms will be available every day at the registration desk.