

# 9<sup>th</sup> SPANISH PORTUGUESE CONGRESS ON ELECTRICAL ENGINEERING (9CHLIE)

## WELCOME TO 9CHLIE

On behalf of the International Scientific Committee and the Organizing Committee we want to give you a very warm welcome to 9CHLIE and to Marbella.

Our International Scientific Committee has selected a high quality 155 papers (among 205 proposals) from which 147 will be presented at the Congress, 60 at oral sessions and 87 at poster sessions, along the three days of the 9CHLIE. All of these are the papers included at the final programme. Also it will be presented six invited papers in plenary sessions.

9CHLIE cover the whole range of problems and solutions concerning with the Electrical Engineering and all the papers have directly influence about these wide field of research and practical work.

We would like to thank all the authors, session chairmen, participants without papers and the International Scientific Committee members who have made important contributions by reviewing the proposals.

In addition to the technical sessions, a number of social events have been arranged. On Thursday evening (30<sup>th</sup> June, 21:00 H) we will be hold a Welcome Dinner at the Swimming Pool Restaurant of the "Hotel Gran Melia Don Pepe" and on Friday (1<sup>st</sup> July, 20:00 H) the Gala Dinner at the Torrequebrada Casino where we will have an aperitif "Spanish wine" and a Flamenco Show by Carmen Mota plus an International Show by José Montes and where we will deliver presents to those people and companies that collaborate with the organization of the 9CHLIE.

For guests accompanying congress participants we have arranged a programme of excursions to the following places of interest:

- **30<sup>th</sup> of June:** Mijas, Puerto Marina, Puerto Banus
- **1<sup>st</sup> of July:** Málaga y Marbella
- **2<sup>nd</sup> of July:** Ronda

I hope you will find the congress intellectually stimulating, that you will make many fruitful personal contacts here and that you will thoroughly enjoy your visit to Marbella, the Sun Coast and the surrounding area.

Thank you very much.

Prof. Dr. Manuel Pérez-Donsión, Chairman  
Prof. Dr. Carlos Lemos Antunes, Vice Chairman

## **OBJETIVES**

The Spanish-Portuguese Congress on Electrical Engineering (Congreso Hispano Luso de Ingeniería Eléctrica - CHLIE) is the natural heir of the Spanish Portuguese Conferences on Electrical Engineering (Jornadas Hispano Lusas de Ingeniería Eléctrica -JHLIE) that were founded in 1990, edition held in Vigo, with the objectives of create an excellence space for the meeting and interchange of experiences and knowledge about Electrical Engineering. Then the purpose is to give an opportunity to academics, scientists, engineers, manufacturers and users from all over the world, and specially from Spain and Portugal, to come together in a pleasant location to discuss recent development in the wide field of Electrical Engineering, facilitate the mutual knowledge and to promote the collaboration amount the Engineers, both from the universities and also from the companies. The last eight editions have taken place in Vigo (1990), Coimbra (1991), Barcelona (1993), Porto (1995), Salamanca (1997), Lisboa (1999), Madrid (2001) and Vilamoura (2003).

The science and technology progress is based on the diffusion of the knowledge and on his contrast by the community of researchers, for this reason the objectives of this event are the ideas debate, a free discussion and a rigorous analysis of those works presented within the frame of the electrical engineering. And we hope that the authors receive from this event enough advantages like for to justify the additional effort for preparing the papers, to attend and to participate actively. This is the main reason of to support and to hold this event and try to push it to all the community.

## **SUBJECTS AND TOPICS**

Like it is traditional, this 9th Spanish Portuguese Congress on Electrical Engineering (9CHLIE) will cover the following subjects:

- 1.- Electrical Energy Systems Analysis
- 2.- Electrical Energy Systems Management
- 3.- Electrical Machines and Power Electronics
- 4.- CAD/CAE Techniques and Simulation
- 5.- Electrical Installations
- 6.- Industrial Production, Instrumentation, Control and Robotics

All the topics are connected, directly or indirectly, with the Electrical Engineering and within these areas:

## **LANGUAGES OF THE CONGRESS**

The Congress languages will be:

- Spanish, Portuguese and English.

## HONOUR COMMITTEE

For a life of work on Electrical Engineering, for their large experience and not for political reason and, specially, for their great collaboration with the organization of the “Jornadas Hispano Lusas de Ingeniería Eléctrica” that were the bases of the actual “Spanish Portuguese Congress on Electrical Engineering” and also for their humanity and kindness we decide include like members of the Honour Committee to:

- L. Humet Coderch, Ex-Professor of Politechnical University of Catalonia (Spain)
- A. Almeida do Vale, Ex-Professor of Porto University (Portugal)

## INTERNATIONAL SCIENTIFIC COMMITTEE

Take into account their eminent position in the world of the Electrical Engineering and their availability and collaboration, we have selected 71 members for the International Scientific Committee.

- |                                |                                   |
|--------------------------------|-----------------------------------|
| Almeida do Vale, A. (Portugal) | Kladas, A. (Greece)               |
| Almeida do Vale, Z. (Portugal) | Kotlanova, A. (Czech Republic)    |
| Arcega Solsona, F. (Spain)     | Leão Rodrigues (Portugal)         |
| Arkkio, A. (Finland)           | Lemos Antunes, C. (Portugal)      |
| Arnulf Kost (Germany)          | Levi, E. (U.K.)                   |
| Bargallo, R. (Spain)           | Llaverías Sanmartí, J. (Spain)    |
| Bartos, V. (Czech Republic)    | Lowther, D. (Canada)              |
| Bastos, J.P. (Brazil)          | Maciel Barbosa, F. (Portugal)     |
| Belmans, R. (Belgium)          | Machado e Moura, A. (Portugal)    |
| Bendl, J. (Czech Republic)     | Maló Machado, V. (Portugal)       |
| Bosch Tous, R. (Spain)         | Marques Cardoso, A. (Portugal)    |
| Brandão Faria, J. (Portugal)   | Molinary, G. (Italy)              |
| Burgos, J.C. (Spain)           | Norio Takaashi (Japan)            |
| Castilla, M. (Spain)           | Orille Fernández, A. (Spain)      |
| Capolino, G.A. (France)        | Pais Diaz, C. (Portugal)          |
| Cardoso, J.R. (Brazil)         | Pastor Gutiérrez, A. (Spain)      |
| Cavallé Sesé, F. (Spain)       | Paulo Coimbra, A. (Portugal)      |
| Charmers, B. (U. K.)           | Pereira Cabrita (Portugal)        |
| Chiricozzi, E. (Italy)         | Pérez Donsión, M. (Spain)         |
| Conejo Navarro, A. (Spain)     | Pérez Hidalgo, G. (Spain)         |
| Cundev, M. (Macedonia)         | Perz, J. (Poland)                 |
| Domingos Moura (Portugal)      | Petkovska, L. (Macedonia)         |
| Eguiluz Morán, L.I. (Spain)    | Ramos, C.S. (Portugal)            |
| Ertan, H.B. (Turkey)           | Rogel Folch, J. (Spain)           |
| Esteves Santana. J. (Portugal) | Sanjurjo Navarro, R. (Spain)      |
| Fernández Cabanas, M. (Spain)  | San Roman, T.G. (Spain)           |
| Fraile Mora, J. (Spain)        | Sanz Badía, M. (Spain)            |
| Garrido, C. (Spain)            | Sanz Feito, J. (Spain)            |
| Gómez Exposito, A. (Spain)     | Serrano Iribarnegaray, L. (Spain) |
| Guemes Alonso, J.A. (Spain)    | Tegopoulos, J.A. (Greece)         |
| Humet Coderch, L. (Spain)      | Traça Almeida, A. (Portugal)      |
| Iwaszkiewicz, J. (Poland)      | Tenreiro Machado, J. (Portugal)   |
| Jesus Araújo, H. (Portugal)    | Teresa Barros, M. (Portugal)      |
| Jimenez Moreno, G. (Spain)     | Wiak, S. (Poland)                 |
| Jokinen, T. (Finland)          | Wilhelmi Ayza, J.R. (Spain)       |
| Göl, Ö. (Australia)            |                                   |

The International Scientific Committee members were the responsible people for the papers evaluation and they take into account the presented digests and considered his originality, interest, quality, elaboration, references and the

agreement between the objectives and the conclusions. Each item could obtain the punctuation from 1 to 10 and then, take into account the results, each member classified the evaluated digests like: excellent, good, average, poor, bad or very bad. The International Scientific Committee members could send remarks of the evaluated digests for to send to the authors (without to say the name of the referee) and also for the Secretariat. Each digest was been evaluated for two International Scientific Committee members.

## **ORGANIZATION COMMITTEE**

### **Chairman:**

Manuel Pérez Donsión (President of AEDIE, Univ. of Vigo - Spain)

### **Vice-Chairman:**

Carlos Lemos Antunes (President of APDE, Univ. of Coimbra (Portugal))

### **Local Committee of collaborators**

Francisco Manuel Pérez Hidalgo (University of Málaga)

José Luis Duran Paz (University of Málaga)

Francisco Vargas Merino (University of Málaga)

Vicente Barranco López (University of Córdoba)

José Luis Olivares Olmedilla (University of Córdoba)

Francisco Ramón Lara Raya (University of Córdoba)

## **SPONSORSHIP**

Sincere thanks are expressed to the organisations listed below who have given valuable support to 9CHLIE:

Unión Fenosa, S.A.

Schneider Electric Española, S.A.

ABB

Circuitor

Sevillana ENDESA

Red Eléctrica Española

## **ENTITIES THAT COLLABORATE WITH 9CHLIE**

The Institutions that collaborate, directly or indirectly, with the Organization of the 9CHLIE are the following: Universities of Vigo, Malaga, Cordoba and Sevilla.



## TECHNICAL CO-SPONSORSHIP

The 9CHLIE has also counted with the invaluable Technical Co-Sponsorship of two distinguished international associations like are: IEEE and the Power Engineering Society (PES), closely bound to IEEE.



## PLENARY SESSIONS

Along the 9CHLIE it will be presented six invited papers in plenary sessions:

### **1.- FACTS: A Modern Tool for Flexible Power Systems Interconnections**

**Enrique Acha**

Department of Electronics and Electrical Engineering, The University of Glasgow, Scotland, UK.

**Enrique Acha** graduated from the University Michoacana de San Nicolas de Hidalgo in 1979 and obtained a PhD degree from the University of Canterbury, Christchurch, New Zealand in 1988. He carried out postgraduate studies at Universidad Nacional Autonoma de México (UNAM) and at University of Manchester Institute of Science and Technology (UMIST), England. He was a post-doctoral fellow at the Universities of Toronto, Canada and Durham, England.

He is the Professor of Electrical Power Systems in the Department of Electronics and Electrical Engineering at the University of Glasgow, Scotland, UK, where he lectures and conducts research on power systems analysis and power electronics applications in renewable energy systems. He was the Chair of the Inter-University Glasgow-Strathclyde Centre for Economic Renewable Power Delivery and Head of the FACTS Research Laboratory. He has authored or co-authored over one hundred IEEE and IEE papers. He is the lead author of three textbooks on modern power systems analysis. He is a Senior Member of IEEE and a member of the Distinguished Lecturers Programme (DLP) of the Power Engineering Society of IEEE.

### **2.- La operación del sistema eléctrico en el Mercado Ibérico**

**D. Ángel Landa López de Ocariz**

Director General Adjunto a Presidencia de REE (Red Eléctrica Española)

Ángel Landa López de Ocariz, nacido el 10.02.41 en Vitoria. Es Ingeniero Industrial por la Escuela Técnica Superior de Ingenieros Industriales de Bilbao. Master of Science por la Carnegie-Mellon University (USA). Miembro del Comité Restringido y de la Asamblea General de la UCTE. Miembro de la Asociación Europea de Operadores del Sistema ETSO. Presidente de la IESOE. Desde 1966 a 1985 trabajó en el área de distribución y de compra-venta de energía. Se incorporó a Red Eléctrica de España en 1985 como Director de Gestión y Planificación de la Explotación y Director de Operación. Desde 1995 a 1998 fue Director Técnico y Director de Regulación en la Comisión del Sistema Eléctrico Nacional. Desde 1998 a Julio de 2002 ha ocupado el cargo de Director General de Operación en Red Eléctrica de España y en la actualidad es Director General adjunto a Presidencia.

UCTE	Union for the Co-ordination of Transmission of Electricity
ETSO	European Transmission System Operators
IESOE	Interconexión Eléctrica del Suroeste de Europa

### **3.- The Politransformer Concept: A Multi-voltage Substation Power Transformer**

**Miguel Oliva Navarrete**

Responsable Técnico de Transformadores Acorazados  
ABB Power Technology, S.A.

**Miguel Oliva Navarrete**, Industrial Engineer, Electrical Engineering speciality, M.Sc. Eng. University of Seville (Spain). Master of Science in Mechanical Engineering, University of Wales, Swansea (UK).

From 1997 to 1998, he works like a Consultant for Andersen Consulting. From 1998 to 2003, he works at the Engineering Department, ABB Power Technology, Cordoba. Power Transformers design activities. Technical specifications of power transformers: Electrical, mechanical and test specifications. Calculation, optimization and design. Design reviews. Project Manager. Responsible of power transformers projects in the USA and Spanish market: Contact person with customers, technical responsibility and coordination, compliance with specifications and standards, design reviews, technical information and documentation, supply management – manufacturing and Quality Assurance follow-up to comply with contractual requirements, shipment and logistics arrangements, installation and commissioning, field testing.

After 2004 he works as Technical Manager. Shell form Transformers. ABB Power Technology, Power Transformers, Cordoba, Spain. Technical and R&D function related to shell form transformers.

### **4.- Power Transparent Distribution: Optimización Energética**

**Sergio López Botella**

Responsable Área de Formación Baja Tensión España  
Schneider Electric España

**Sergio López Botella**, Telecommunications Engineer, he works along 8 years developed projects at the Technical Office of the Elicor S.L. company. During the last 5 year he collaborate with the Training Centre of Schneider Electric, S.A.

### **5.- Política de Ahorro y Eficiencia Energética**

**María del Valle Higuera Rabadán**

Responsable del Centro de Eficiencia Energética de Unión Eléctrica FENOSA, S.A

**María Higuera Rabadán**, Ingeniero Industrial Especialidad Máquinas por la Universidad Politécnica de Madrid (1989-1995).

1996: Andersen Consulting: consultor junior

1996-1998: Repsol YPF. Ingeniero de Proyectos en la Refinería de Escombreras (Murcia).

1998-2005: Unión FENOSA, desempeñando diversas funciones:

Responsable de Ofertas de Energía

Responsable de Compras de Energía

Responsable de Desarrollo de Líneas de Negocio

Actualmente: Responsable del Centro de Eficiencia Energética

### **6.- The CableCURE Technology for Revitalization of “Water Tree” Damaged Medium Voltage Cables**

**Siegmar Vogel**

CableCURE, Germany

## **PAPERS PUBLICATION**

The full paper will be included in the 9CHLIE CDROM. The short version of the paper will be included in the 9CHLIE Book of Summaries. The ISBN of the CDROM will be different of the Proceedings ISBN.

## **PAPERS PRESENTATION**

The authors could say previously to the 9CHLIE Secretariat their preferences concerning with the paper presentation, that could be an oral or poster presentation, the authors preferences were been take into account within the possibilities of the programme. In this sense the general criterion was to classify the full papers take into account the general or specific characteristics of the work and then to reserve the more general for oral sessions and the more specific ones for to permit a more personal, deep and detailed discussion between more specialized interlocutors for the poster sessions. In any case this classification don't means any difference or valuation concerning with the scientific-technical quality of the works. Of course we will not make any difference, because really do not exist, neither in the CDROM nor in the Proceedings, between oral and poster presentations

### **Oral Presentations**

Each speaker of an oral presentation has an available time of 18 minutes (15 minutes for the presentation and 3 minutes for questions) and must be in the session room 10 minutes before of the beginning of the session for to test the audiovisual equipment and for to exchange opinions with the Session Chairman.

### **Poster Presentations**

The poster must be put on the pin board that the authors previously can chose about 15 minutes before of the beginning of the session and it must be take off 15 minutes after of the end of the session. The author(s) must be stay near the poster about 45 minutes of the session duration for to answer all the questions that the audience or the chairmen could formulate. The available surface for each poster is 1,20m x 1,50 m (width x high).

## **CHAIRMEN SESSIONS**

On behalf of the International Scientific Committee and the Local Organising Committee of 9CHLIE and take into account their eminent position in the world of science we have selected 30 session chairmen. It is an honour for us their collaboration for to chair the sessions of 9CHLIE and their contribution would be greatly appreciated. We wish to express our warmer thanks.

Traditionally the Chairman of each Session is independent in organising the Session. Nevertheless is of special importance that the different sessions chairmen preparing questions about the papers of his session in order to get a

more dynamic one. Furthermore we expect of the sessions chairmen the following:

**- Plenary sessions.**

That each plenary session should not exceed 60 minutes including presentation and discussion, (45 minutes for presentation and 15 minutes for questions).

**-Oral sessions.**

That each oral paper presentation should not exceed 18 minutes including presentation and discussion, (15 minutes for presentation and 3 minutes for questions).

TABLE I. Chairmen Session distribution

<b>Thursday 30 June, 2005</b>		
16:30-17:30	PLENARY SESSION PL1	Antonio Gómez Exposito
17:30-18:30	PLENARY SESSION PL2	Jesús Fraile Mora
18:30-19:15	POSTER SESSION D1	Antonio Carvalho Andrade
		Luis Rouco Rodríguez
		Christian Grabner
19:15-20:45	ORAL SESSION A1	Antonio J. Marques Cardoso
	ORAL SESSION B1	Manuel Burgos Payan
	ORAL SESSION C1	Patricio Salmeron Revuelta
<b>Friday 1 July, 2005</b>		
9:00-10:00	PLENARY SESSION PL3	Carlos Lemos Antunes
10:00-11:00	PLENARY SESSION PL4	Antonio Almeida do Vale
11:00-11:45	POSTER SESSION D2	Armando Soler Botella
		Mafalda María Morais Seixas
		Mario Javier Duran Martínez
11:45-13:15	ORAL SESSION A2	Manes Fernández Cabanas
	ORAL SESSION B2	Carlos Garrido Suárez
	ORAL SESSION C2	Santiago Arnaltes Gómez
15:30-16:30	PLENARY SESSION PL5	Vicente Barranco López
16:30-17:15	POSTER SESSION D3	Juan Manuel Ramirez-Arredondo
		María Dolores Gutiérrez Ochoa
		Marina Perdigão
17:15-18:45	ORAL SESSION A3	Zita Almeida do Vale
	ORAL SESSION B3	Francisco Arcega Solsona
	ORAL SESSION C3	Manuel Castilla Ibañez
<b>Saturday 2 July, 2005</b>		
9:30-10:30	PLENARY SESSION PL6	Francisco Pérez Hidalgo
10:30-11:15	POSTER SESSION D4	Ivo Dolezel
		Elmano Margato
		L. Fernando Mantilla Peñalva
11:15-12:45	ORAL SESSION A4	José Roger Folch
	ORAL SESSION B4	Inmaculada Zamora Belver
	ORAL SESSION C4	Ramón Bargallo Perpiña



## **-Poster sessions.**

The author(s) of a poster presentation must be stay near the poster along the 45 minutes of the session duration and in order to get a more dynamic session it is important that along this period of time each of the chairmen of the poster session formulate questions to the authors and check that all is OK.

## **SOCIAL EVENTS**

- **Welcome Dinner:** On Thursday evening (30<sup>th</sup> June, 21:00 H) at the Swimming Pool Restaurant of the "Hotel Gran Melia Don Pepe" entertained by a Spanish Guitarist.

- **Gala Dinner:** On Friday (1<sup>st</sup> July, 20:00 H) 17<sup>th</sup> at the Torrequebrada Casino where we will have an aperitif "Spanish wine" and a Flamenco Show by Carmen Mota plus a International Show by José Montes and where we will deliver presents to those people and companies that collaborate with the organization of the 9CHLIE.

## **NAME BADGE.**

An admission badge will be provided to each participant. This badge entitles access to the technical sessions and should be worn through the congress.

## **VENUE.**

The 9CHLIE will be hold in Hotel Gran Meliá Don Pepe, five stars 'Gran Luxury' hotel, in Marbella, Sun Coast (Málaga), in the "Gold Mile", with excellent installations and with direct connection to the seaside promenade and the beach.

Address: José Meliá, s/n, 29600 Marbella-Málaga.  
Tel:(0034)952770300  
Fax.:(0034)952779954  
web:www.donpepe-marbella.com

**Marbella.** It is situated on the Southern edge of Europe, at a half distance between Málaga and Gibraltar and a few hours driven from the Andalusia capitals of Sevilla, Granada and from the winter station of Sierra Nevada. With excellent golf courses, open during all the year thanks to his climate. His yachting harbours "Cabo Pino", "Club Náutico" and the famous "José Banús", with his happy and cheerful mariner village. His modern commercial centres and more than hundred shops. Beautiful parks and walks "Marítimo", "Alameda", "del Mar", "de la Constitución".

**Airport.** The airport is situated between Málaga and Torremolinos, at about 50 km from Marbella, with a buses fleet that permit a direct connection from the airport to Marbella.

Phone number.:(0034)952048842  
and (0034)952048838  
Web:http://www.aena.es

**Train.** The train station is situated in Málaga, at about 60 km from Marbella, with a buses fleet that permit a direct connection from the train station to Marbella and also one can go by taxi.

**Transport by road.** Marbella has a road infrastructure excellent, with main road and motorway with Málaga (60 km), Granada (190 km), Sevilla (220 km), Gibraltar (80 km), Ronda (50 km).

**Climate.** Marbella enjoys during all the year an average temperature of 18,7 degrees centigrade and an average of 320 sunny days.

## SECRETARIAT

Along the 9CHLIE we will have open an active Secretariat place near the session rooms with the following timetable:

SECRETARIAT TIMETABLE	
Thursday 30 <sup>th</sup> of June	10:00 – 13:00 H
	17:00 – 19:30 H
Friday 1 <sup>st</sup> of July	10:00 -- 13:00 H
	16:30 – 18:00 H
Saturday 2 <sup>nd</sup> of July	10:00 --13:00 H

## GENERAL SECRETARIAT



The General Secretariat of the 9CHLIE, is:

AEDIE  
Electrical Engineering Department  
Vigo University  
ETS Ingenieros Industriales  
Campus of Lagoas-Marcosende  
36310 VIGO (Spain)  
Phone number: +34 687468629  
Fax +34 986812685

e-mail: [aedie@aedie.org](mailto:aedie@aedie.org)

web page: <http://www.aedie.org>

# GENERAL TECHNICAL PROGRAMME 9CHLIE

Thursday 30 June 2005										
10:00 – 13:00	<b>Registration</b>									
16:00 - 16:30	<b>Openig Ceremony ROOM A “Unión Fenosa” (Salón Bellavista)</b>									
16:30 – 17:30	<b>PL1</b>	<b><i>FACTS: A Modern Tool for Flexible Power Systems Interconnections</i></b> Speaker of IEEE: Enrique Acha Department of Electronics and Electrical Engineering, The University of Glasgow, Scotland, UK .								
17:30 – 18:30	<b>PL2</b>	<b><i>La operación del sistema eléctrico en el Mercado Ibérico</i></b> D. Ángel Landa López de Ocariz Director General Adjunto a Presidencia de REE (Red Eléctrica Española)								
EXTRA TIME FOR DISCUSSION										
18:30 – 19:15	Posters Session at Room D <b>(Session D1)</b> Coffee Break						203	205	206	
						207	210	214		
						215	222	228		
						231	233	247		
						253	255	268		
						270	299	314		
						316	319	352		
						360				
	<b>ROOM A</b> “Unión Fenosa” (Salón Bellavista)			<b>ROOM B</b> “Schneider” (Salón Marbella)			<b>ROOM C</b> “ABB” (Salón Sierra Blanca)			
	<b>Oral session A1</b>			<b>Oral session B1</b>			<b>Oral session C1</b>			
19:15 – 20:45	202	212	274	306	328	357	216	217	249	
	294	318		374	384		262	349		
EXTRA TIME FOR DISCUSSION										
21:00 - 23:00	<b>WELCOME DINNER AT THE SWIMMING POOL RESTAURANT</b> “Hotel Gran Melia Don Pepe” entertained by a Spanish Guitarist									

Friday 1 July 2005										
	<p align="center"><b>ROOM A</b>  “Unión Fenosa”  (Salón Bellavista)</p>									
9:00 – 10:00	PL3	<p><b><i>The Politransformer Concept: A Multi-voltage Substation Power Transformer</i></b>  Miguel Oliva Navarrete  Responsable Técnico de Transformadores Acorazados  ABB Power Technology, S.A.</p>								
10:00 – 11:00	PL4	<p><b><i>Power Transparent Distribution: Optimización Energética</i></b>  Sergio López Botella  Responsable Área de Formación Baja Tensión España  Schneider Electric España</p>								
EXTRA TIME FOR DISCUSSION										
11:00 – 11:45	Posters Session at Room D ( <b>Session D2</b> ) Coffee Break					211	218	224		
						225	237	256		
						257	267	273		
						292	315	326		
						339	345	346		
						354	367	370		
						380	399	402		
	<p align="center"><b>ROOM A</b>  “Unión Fenosa”  (Salón Bellavista)</p>			<p align="center"><b>ROOM B</b>  “Schneider”  (Salón Marbella)</p>			<p align="center"><b>ROOM C</b>  “ABB”  (Salón Sierra Blanca)</p>			
	<b>Oral session A2</b>			<b>Oral session B2</b>			<b>Oral session C2</b>			
11:45 – 13:15	219	246	301	220	289	309	282	283	358	
	348	366		310	324		359	386		
EXTRA TIME FOR DISCUSSION										
13:30 – 15:30	<p align="center"><b>LUNCH AT THE SWIMMING POOL RESTAURANT</b>  “Hotel Gran Melia Don Pepe”</p>									

	<b>ROOM A</b> "Unión Fenosa" (Salón Bellavista)											
15:30 – 16:30	<b>PL5</b>		<b>Política de Ahorro y Eficiencia Energética</b> María del Valle Higuera Rabadán Responsable del Centro de Eficiencia Energética de Unión Eléctrica FENOSA, S.A									
EXTRA TIME FOR DISCUSSION												
16:30 – 17:15	Posters Session at Room D <b>(Session D3)</b> Coffee Break			230	252	278	281	284	286	287	297	298
				302	305	322	356	365	376	389	391	392
				393	397	400	404					
<b>Friday 1 July 2005</b>												
				<b>ROOM A</b> "Unión Fenosa" (Salón Bellavista)			<b>ROOM B</b> "Schneider" (Salón Marbella)			<b>ROOM C</b> "ABB"(Salón Sierra Blanca)		
				<b>Oral session A3</b>			<b>Oral session B3</b>			<b>Oral session C3</b>		
17:15 – 18:45				227	234	238	271	295	303	275	335	378
				245	272		355	379		385	394	
EXTRA TIME FOR DISCUSSION												
20:00 – 1:00	<b>GALA DINNER</b> <i>Fortuna Show Room, Torrequebrada Casino Benalmádena</i>											

**Note:** The Fortuna Show Room is unique in the Costa del Sol and is host to a fascinating Flamenco Show by Carmen Mota plus a spectacular International Show by José Montes.

At the end of the Gala Dinner and the show we will deliver a silver plate or similar to the most important sponsors. This companies are: UNIÓN FENOSA, SCHNEIDER ELECTRIC, ABB and CIRCUTOR. Also we will deliver the gold medal of AEDIE to Luis Humet Coderch and Antonio Almeida do Vale great collaborators with the organization of the "Jornadas Hispano Lusas de Ingeniería Eléctrica" that were the bases of the actual "Spanish Portuguese Congress on Electrical Engineering"

The buses departure will be from the "Hotel Gran Melia Don Pepe" at 19:00 H and from the Torrequebrada Casino at 1:00 H.

First we will have an aperitif "Spanish Wine" at the Terrace after that the dinner, the spectacle and then the interesting people could pay a short and free visit to the Casino. For to visit the casino you will need the DNI or passport.

Saturday 2 July 2005										
	<p align="center"><b>ROOM A</b>  “Unión Fenosa”  (Salón Bellavista)</p>									
9:30 – 10:30	PL6	<p><b>The CableCURE Technology for Revitalization of  “Water Tree” Damaged Medium Voltage Cables</b>  Siegmar Vogel  CableCURE, Germany</p>								
EXTRA TIME FOR DISCUSSION										
10:30 – 11:15	Posters Session at Room D <b>(Session D4)</b> Coffee Break						239	277	291	
						300	312	320		
						325	329	330		
						331	337	340		
						341	350	368		
						369	373	377		
						381	382	383		
						390				
	<b>ROOM A</b> “Unión Fenosa” (Salón Bellavista)			<b>ROOM B</b> “Schneider” (Salón Marbella)			<b>ROOM C</b> “ABB” (Salón Sierra Blanca)			
	<b>Oral session A4</b>			<b>Oral session B4</b>			<b>Oral session C4</b>			
11:15 – 12:45	232	254	279	251	269	288	223	236	259	
	296	311		293	304		321	398		
EXTRA TIME FOR DISCUSSION										
12:45 – 13:15	<p align="center"><b>Conclusions and time for the next congress (XCLEEE)</b></p>									
13:30 – 15:30	<p align="center"><b>FAREWELL LUNCH AT THE SWIMMING POOL  RESTAURANT</b>  “Hotel Gran Melia Don Pepe”</p>									

**Thursday 30 June 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

**16:00 – 16:30 OPENING CEREMONY**

**16:30 – 17:30 PLENARY SESSION PL1**

**Chairman:** Antonio Gómez Exposito

***FACTS: A Modern Tool for Flexible Power Systems Interconnections***

Speaker of IEEE: Enrique Acha

Department of Electronics and Electrical Engineering, The University of Glasgow, Scotland, UK

**17:30 – 18:30 PLENARY SESSION PL2**

**Chairman:** Jesús Fraile Mora

***La operación del sistema eléctrico en el Mercado Ibérico***

D. Ángel Landa López de Ocariz

Director General Adjunto a Presidencia de REE (Red Eléctrica Española)

**18:30 – 19:15 POSTER SESSION D1 – Coffee Break**

**Chairmen:** Antonio Carvalho Andrade, Luis Rouco Rodríguez, Christian Grabner

**203 *Steady-State Performance Analysis of Brushless DC Propulsion Motor.***

Xie Wei, Wang Yajin, Hao Ying.  
Shanghai Maritime University, China.

**205 *Gas Turbine Control. Modifications for: Availability and Limitation of Spinning Reserve and Limitation of Non-desired Unloading.***

J.L. Agüero<sup>1</sup>, M.C. Beroqui<sup>1</sup>, H. Di Pasquo<sup>2</sup>.  
<sup>1</sup> Universidad Nacional de La Plata, Argentina  
<sup>2</sup> Central Térmica Tucumán, Argentina

**206 *Simulating DSM Impact in the New Liberalized Electricity Market***

V. Figueiredo, D. Rodrigues, Z. Vale  
Polytechnique Institute of Porto, School of Engineering, Portugal

- 207 ***Embedding FACTS into the grid for optimizing its operation***  
 Juan M. Ramírez<sup>1</sup>, Hugo Gil Oliva<sup>2</sup>  
<sup>1</sup>Cinvestav- Unidad Guadalajara, México  
<sup>2</sup>CENAFE – CEE, México
- 210 ***Influence of Tidal Power Generation in the Self-Scheduling of a Price-Maker Producer***  
 Sebastián de la Torre  
 Universidad de Málaga, Spain
- 214 ***Clasificación y Localización de Faltas, utilizando Wavelets y Redes Neuronales***  
 Miguel Martínez L<sup>1</sup>, Julio Martínez M<sup>2</sup>  
<sup>1</sup> Universidad Simón Bolívar, Caracas, Venezuela  
<sup>2</sup> ETSII, Universidad Politécnica de Madrid, Spain
- 215 ***Power units heat rate and electricity competitive markets***  
 Alfonso Pantoja López  
 ETSI Minas, Universidad Politécnica de Madrid, Spain
- 222 ***Calculation of Low Voltage Distributors taking into account their Temperature***  
 Miguel Angel Rodríguez Pozueta, José Ramón Landeras Díaz, Fernando Mantilla Peñalva  
 ETSII y T, Universidad de Cantabria, Spain.
- 228 ***Ferroresonant Overvoltage Investigation in Wye-Wye Transformers on Transmission System by Using MATLAB***  
 B. Vahidi, R. Shariati Nassab, S. Ghahghahe Zadeh, E. Abedi  
 Amirkabir University of Technology, Tehran, Iran
- 231 ***Influence of the Rotor Geometry on Stator Current of PMSM(s)***  
 J.A. Güemes Alonso, A.M. Iraolagoitia Iriondo  
 EUITI, University of the Basque Country, Spain
- 233 ***Mágina y los Elementos. Aplicación de las Energías Renovables en una Comarca Andaluza***  
 Verdejo Espinosa, M.A.<sup>1</sup>, Sáenz Ruiz, J.R.<sup>2</sup>, Fernández Moreno, J.<sup>1</sup>, Durán Martínez, M.<sup>3</sup>  
<sup>1</sup> Dpto. Ing. Eléctrica, EUP, Universidad de Jaén, España  
<sup>2</sup> Dpto. Ing. Eléctrica, ESI, Universidad de Cádiz, España  
<sup>3</sup> Dpto. Ing. Eléctrica, ESII, Universidad de Sevilla, España
- 247 ***Multipurpose digital filter to compensate CT's saturation and estimate harmonic components***  
 J. Lázaro Domínguez, M.A. Zorrozuza Arrieta, J.F. Miñambres Argüelles, M. Sánchez Benito, B. Larrea Jaurrieta  
 Universidad del País Vasco, Spain
- 253 ***Acondicionamiento de Cargas No lineales con Tensiones Distorsionadas***  
 Jaime Prieto, Patricio Salmerón, Salvador P. Litran  
 EPS de la Rábida, Universidad de Huelva, España



- 255 ***A Test-rig to Evaluate a Dual-3-Phase Induction Motor Drive***  
 Bojoi R.<sup>1</sup>, Tenconi A.<sup>1</sup>, Profumo F.<sup>1</sup>, Gallardo S.<sup>2</sup>, Barrero F.<sup>2</sup> y Toral S.<sup>2</sup>  
<sup>1</sup> Politecnico di Torino, Turín, Italy  
<sup>2</sup> University of Seville, Seville, Spain
- 268 ***Incidencia energética y medioambiental del aprovechamiento de energía solar fotovoltaica en el Sur y Este de la Isla de Gran Canaria***  
 Felipe Díaz Reyes, Domingo Valido de la Nuez, Javier Cruz Norro, Antonio Pulido Alonso, Jesús Romero Mayoral, José C. Quintana Suárez  
 Universidad de Las Palmas de Gran Canaria, España
- 270 ***Study of Reduction of Load Peak Curves Using Microturbines***  
 Mario Ortiz García<sup>1</sup>, Sergio Valero Verdú<sup>1</sup>, Antonio Gabaldón Marin<sup>2</sup>, Carolina Senabre Blanes<sup>1</sup>, Manuel Peñarrubia Guerrero<sup>1</sup>, Fco. García Franco<sup>2</sup>  
<sup>1</sup> Universidad Miguel Hernández, Elche, Spain  
<sup>2</sup> Universidad Politécnica de Cartagena, Spain
- 299 ***Asignación de consumos a subestaciones de tracción***  
 Jorge Muñoz Riesco, Eduardo Pilo de la Fuente, Antonio Fernández Cardador, Paloma Cucala García  
 I. de Investigación Tecnológica, Universidad Pontificia Comillas de Madrid, España
- 314 ***Water resources valuation in competitive environments***  
 Javier Reneses, Natalia Mosquera, Efraim Centeno, Julián Barquín  
 Instituto de Investigación Tecnológica, ETSII - ICAI, Universidad Pontificia de Comillas de Madrid, Spain
- 316 ***FACTS Formas de usar más eficientemente las líneas eléctricas existentes***  
 Faustino de la Bodega, María Dolores Gutiérrez, Zalao Aginako, Koldovika J. Sagastabeitia  
 EUITI de Bilbao, Universidad del País Vasco, Spain
- 319 ***Power Conditioning Performance Analysis for a Fuel Cell Power Plant***  
 João Carvalheiro<sup>1</sup>, Rui Castro<sup>2</sup>  
<sup>1</sup> Instituto Politécnico de Tomar, Portugal  
<sup>2</sup> Instituto Superior Técnico, CEEL, Centro de Energía Eléctrica do IST, Lisboa, Portugal
- 352 ***Analysis of Crucial End Effects of Switched Reluctance Machines by 3D Finite Element Calculations***  
 C. Grabner  
 Research and Development Motors, Siemens AG, Germany
- 360 ***Available Transfer Capacity between two areas: Iberian grid application***  
 P. Carola, B. Madeira, E.S. Reis, M. Pinto  
 Divisão de Planeamento de Rede, REN, Rede Eléctrica Nacional, Portugal

**Thursday 30 June 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

**19:15 – 20:45 ORAL SESSION A1**

Area 3: Electrical Machines and Power Electronics

**Chairman:** Antonio J. Marques Cardoso

- 202 *Evaluation and Comparison of Fault Tolerant Switched Reluctance Machines for a Specific Application.*  
**Schramm A, Gerling D.**  
Universität der Bundeswehr München, Germany
- 212 *Parameters identification of excitation synchronous generators of power electric systems of Cuba*  
Juan G. Boza Valeriano<sup>1</sup>, Alberto Aguado Behar<sup>2</sup>, Alfredo Gómez I<sup>2</sup>., Francisco Pérez<sup>3</sup>  
<sup>1</sup> Instituto Superior Politécnico “José Antonio Echeverría” (ISPJAE), Cuba  
<sup>2</sup> Instituto de Cibernética Matemática y Física, Ciudad de la Habana, Cuba
- 274 *Harmonic current injection in multi-phase machines for high specific torque including skin effect*  
Mario J. Duran<sup>1</sup>, Sergio Ceballos<sup>1</sup>, M. Ángeles Verdejo<sup>2</sup>, Francisco Pérez<sup>3</sup>  
<sup>1</sup> University of Seville, Spain  
<sup>2</sup> University of Jaén, Spain  
<sup>3</sup> University of Málaga, Spain
- 294 *Determination of the Dynamic Parameters of a Laboratory Synchronous Machine by Standstill Frequency Response Test*  
Salvador Campos, Tomás I. Asiaín, Daniel Ruiz-Vega  
Instituto Politécnico Nacional, ESI. Mecánica y Eléctrica, D.F. México
- 318 *Study of the startup transient for the diagnosis of broken bars in induction motors: A review*  
J.A. Antonino, M. Riera, J. Roger-Folch, V. Clímente  
ETSII, Universidad Politécnica de Valencia, Spain

**Thursday 30 June 2005**

**ROOM B “Schneider”  
(Salón Marbella)**

**19:15 – 20:45 ORAL SESSION B1**

Area 1: Electrical Energy Systems Analysis

**Chairman:** Manuel Burgos Payan

**306 *Metodología para la supervisión de la fiabilidad de las redes de transporte y distribución***

Pedro José Martínez Lacañina, Antonio de la Villa Jaén, José Martínez Ramos  
Escuela Superior de Ingenieros, Universidad de Sevilla, España

**328 *Modelado de un trasvase natural en un problema de optimización de la explotación hidroeléctrica de medio plazo***

Rocío Moraga<sup>1</sup>, Javier García-González<sup>1</sup>, Ernesto Parrilla<sup>1</sup>, Sergio Nogales<sup>2</sup>  
<sup>1</sup> Instituto de Investigación Tecnológica, ETSII - ICAI, Universidad Pontificia de Comillas de Madrid, España  
<sup>2</sup> ENDESA, S.A., Subdirección de Análisis y Previsiones, Madrid, España

**357 *Optimal reactive power compensation levels in a transmission substation Load and network model sensibility***

M<sup>a</sup>. Rita Guedes da Silva, Antonio Pitarma  
Divisão de Planeamento de Rede, Dpto. Planos de Rede, REN, Rede Eléctrica Nacional, Sacavém, Portugal

**374 *Short-term wind power prediction based on AR models***

Mario J. Durán, Daniel Cros, Jesús Riquelme  
Electrical Engineering Department, Universidad de Sevilla, Spain

**384 *Location of phase to ground and phase to phase faults in a power distribution system***

M. Vinyoles<sup>1</sup>, J. Mélendez<sup>1</sup>, S. Herraiz<sup>1</sup>, J. Sánchez<sup>2</sup>, M. Castro<sup>2</sup>  
<sup>1</sup> eXiT Group, EPS University of Girona, Spain  
<sup>2</sup> Endesa Distribución Eléctrica SLU, Spain

**Thursday 30 June 2005**

**ROOM C “ABB”**  
(Salón Sierra Blanca)

**19:15 – 20:45 ORAL SESSION C1**

Area 5: Electrical Installations

**Chairman:** Patricio Salmeron Revuelta

- Fundamental Reactive Power and Unbalanced Current Compensator Connected to Low Voltage Power Network***  
216 Manuel Coxe<sup>1,3</sup>, Gil Marques<sup>1</sup>, Jorge Assis<sup>1</sup>, Pedro Berdelho<sup>1,2</sup>  
<sup>1</sup> Instituto Superior Técnico, Lisboa, Portugal  
<sup>2</sup> Entidade Reguladora dos Serviços Energéticos, Lisboa, Portugal  
<sup>3</sup> Rede Eléctrica Nacional, Sacavem, Portugal
- Coordination and Selection of Expulsion and Current-Limiting Fuses in Pad-Mounted Transformer Primary Protection***  
217 Inmaculada Zamora, G. Buigues, A.J. Mazón, P. Eguía  
University of Basque Country, Spain
- Efecto Palanca en la Distribución de Potenciales Eléctricos Tridimensionales en Terrenos Heterogéneos***  
249 Joaquin Niclós Ferragut<sup>1</sup>, Armando Soler Botella<sup>2</sup>  
<sup>1</sup> Dr. Ingeniero Industrial, Valencia, España  
<sup>2</sup> Universidad Politécnica de Valencia, España
- A Modified Modulation Technique for Multilevel Converters with a Wide Range of Modulation Indexes and Minimized Harmonic Distortion at Low Indexes***  
262 H.R. Akbari, G.B. Gharehpetian  
Amirkabir University of Technology, Tehran, Iran
- Harmonics on the Electromagnetic Torque of a Slip Energy Recovery System with Two Thyristor Bridges and no DC Coil***  
349 M.T. Outeiro<sup>1</sup>, E.S. Saraiva<sup>2</sup>  
<sup>1</sup> Instituto Superior de Engenharia de Coimbra, Portugal  
<sup>2</sup> Faculdade de Ciências e Tecnologia, University of Coimbra, Portugal

21:00 - 23:00

**DINNER AT THE SWIMMING POOL RESTAURANT**  
“Hotel Gran Melia Don Pepe”  
entertained by a Spanish Guitarist

**Friday 1 July 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

**9:00 – 10:00 PLENARY SESSION PL3**

**Chairman:** Carlos Lemos Antunes

***The Politransformer Concept: A Multi-voltage Substation Power Transformer***

Miguel Oliva  
Responsable Técnico de Transformadores Acorazados  
ABB Power Technology, S.A.

**10:00 – 11:00 PLENARY SESSION PL4**

**Chairman:** Antonio Almeida do Vale

***Power Transparent Distribution: Optimización Energética***

Sergio López Botella  
Responsable Área de Formación Baja Tensión España  
Schneider Electric España

**11:00 – 11:45 POSTER SESSION D2 – Coffee Break**

**Chairmen:** Armando Soler Botella, Mafalda María Morais Seixas, Mario Javier Duran Martínez.

**211 *Control of Single-Phase Dynamic Voltage Restorers Using a Fully-Configurable Digital Estimation Technique***

Victor M. Moreno<sup>1</sup>, Alberto Pigazo<sup>1</sup>, Marco Liserre<sup>2</sup>, Antonio Dell'Aquila<sup>2</sup>  
<sup>1</sup> Universidad de Cantabria, España  
<sup>2</sup> Politecnico de Bari, Italia

**218 *Overcurrent and Overvoltage Protection devices in Pad-Mounted Transformers***

Inmaculada Zamora, G. Buigues, A.J. Mazón, P. Eguía  
University of Basque Country, Spain

- Normativa Autonómica para la Protección de la Avifauna en Instalaciones Eléctricas**  
 224 Ramos Herranz, José A., Campayo Martín, José J., Zamora Belver, Inmaculada, Mazón Sainz-Maza, A. Javier  
 Universidad del País Vasco, España
- Avifauna y tendidos eléctricos: Actuaciones y posibilidades**  
 225 J.J. Campayo Martín, J.A. Ramos Herranz, I. Zamora Belver, A.J. Mazón Sainz-Maza  
 Universidad del País Vasco, España
- Gestión Energética de los motores eléctricos: mejora de la eficiencia de los accionamientos con el uso de variadores de velocidad**  
 237 Luis Fernando Mantilla Peñalva, Juan Antonio Cardona Pardo  
 ETSII y T, Universidad de Cantabria, España
- Control area network domotic prototype using GPRS and Ethernet interfaces for virtual monitoring applications**  
 256 Cortes F., Gallardo S., Barrero F., Toral S.  
 University of Seville, Spain
- Application of the Three-Phase STATCOM in Voltage Stability**  
 257 Juan M. Ramírez, J.L. Murillo Pérez  
 National Polytechnic Institute, Guadalajara, México
- Joint wavelet-Fourier analysis of power system disturbances**  
 267 Juan Carlos Bravo<sup>1</sup>, Dolores Borrás<sup>1</sup>, Manuel Castilla<sup>1</sup>, Antonio López<sup>2</sup>, Jaime Gutiérrez<sup>3</sup>, Juan Carlos Montaña<sup>4</sup>  
<sup>1</sup> Dpto. Ingeniería Eléctrica, Escuela Universitaria Politécnica, Sevilla, Spain  
<sup>2</sup> Dpto. Tecnología Electrónica, Escuela Universitaria Politécnica, Sevilla, Spain  
<sup>3</sup> Dpto. de Física Aplicada, Escuela Superior de Ingenieros, Sevilla, Spain  
<sup>4</sup> Consejo Superior de Investigaciones Científicas (CSIC), Sevilla, Spain
- Effects of Magnetizing Inrush Current on Power Quality and Distributed Generation**  
 273 Mañana, M, Eguíluz, L.I., Ortiz, A., Díez, G., Renedo, C., Pérez, S.  
 ETSII y T., University of Cantabria, Spain
- Aplicación de los filtros híbridos en la mejora de la calidad de potencia eléctrica**  
 292 Salvador P. Litrán, Patricio Salmerón, Jaime Prieto, Jesús R. Vázquez  
 Escuela Politécnica Superior, Universidad de Huelva, España
- Evaluación de Riesgos y Análisis de las Medidas Preventivas en los Laboratorios Docentes de Máquinas Eléctricas**  
 315 J. Cruz, F. Díaz, A. Pulido, G. Hernández, C. Quintana, J. Romero  
 Universidad de Las Palmas de Gran Canaria, España
- Controlo de velocidade de un MCC com limitador de corrente integrado em comutador da tensão de alimentação**  
 326 D. Foito<sup>1,2</sup>, M. Guerreiro<sup>1</sup>  
<sup>1</sup> EST Setúbal, Instituto Politécnico de Setúbal, Portugal  
<sup>2</sup> Centro de Automática da Universidade Técnica de Lisboa, Portugal

- 339 ***Accelerated Ageing Test Applied to the Early Detection of Insulation Failures in Low Voltage Induction Motors***  
M.G. Melero, M.F. Cabanas, C. Rojas, F. Pedrayes, G.A. Orcajo, J.M. Cano  
Universidad de Oviedo, Spain
- 345 ***Accuracy Investigation of CFC Method for Sensorless Vector Control of Salient Pole Synchronous Motors***  
Essam Eddin M. Rashad  
Faculty of Engineering, Tanta University, Egypt
- 346 ***Self Excited Induction Generator Controlled by a Digital Signal Processor***  
José Faria<sup>1,3,4</sup>, Elmano Margato<sup>1,3,4</sup>, M.J. Resende<sup>2,4</sup>  
<sup>1</sup> Instituto Superior de Engenharia de Lisboa, Portugal  
<sup>2</sup> Instituto Superior Técnico, Lisboa, Portugal  
<sup>3</sup> Centro de Electrotecnia e Electrónica Industrial, Lisboa, Portugal  
<sup>4</sup> Centro de Automática da Universidad Técnica de Lisboa, Portugal
- 354 ***Switched Reluctance motor drive with online control of turn-on and turn-off angles***  
B. Blanqué, J.L. Perat, P. Andrada  
Dpto. d'Enginyeria Eléctrica, Universidad Politècnica de Catalunya, Spain
- 367 ***Torque Optimization of the Interior-Permanent Magnet Synchronous Motor using Design Sensitivity Analysis***  
Mohammadreza Hassan Zadeh<sup>1</sup>, Arash Kiyoumarsí<sup>2</sup>  
<sup>1</sup> Abhar Islamic Azad University, Abhar, Iran  
<sup>2</sup> Isfahan University, Isfahan, Iran
- 370 ***Effect of Modelling Network Transients on the Response of Wind Generators Base don Squirrel Cage Induction Machines to Voltage Dips***  
L. Rouco, P. González, J.L. Zamora  
ETS de Ingeniería, IIT, Universidad Pontificia de Comillas, Madrid, Spain
- 380 ***Diseño de filtros pasivos, activos e híbridos para la compensación armónica de cargas trifásicas no lineales***  
Jesús R. Vázquez, J.L. Flores, Patricio Salmerón, Salvador P. Litrán  
Escuela Politécnica Superior, Universidad de Huelva, España
- 399 ***Mobile Platform for Ferromagnetic Surfaces Inspection with Variable Gradient***  
A Leão Rodrigues, Pedro Pereira  
Facultade de Ciências e Tecnologia, Universidade Nova de Lisboa, Portugal
- 402 ***Estudio Comparativo de una instalación de trigeneración con microturbina de gas y un sistema convencional con bomba de calor en un complejo hotelero.***  
Lluís Massagués<sup>1</sup>, Joaquín Rodríguez, Joan Carles Bruno<sup>2</sup>, Alberto Coronas<sup>2</sup>  
<sup>1</sup> ETSE, Universitat Rovira u Virgili, Tarragona, España  
<sup>2</sup> CREVER - Universitat Rovira u Virgili, Tarragona, España

Friday 1 July 2005

ROOM A "Unión Fenosa"  
(Salón Bellavista)

**11:45 – 13:15 ORAL SESSION A2**

Area 3: Electrical Machines and Power Electronics

**Chairman:** Manes Fernández Cabanas

219 ***Main inductance determination in rotating machines. Analytical and Numerical calculation: A didactical approach***

Bargallo, R., Llaverias, J., De Blas, A., Martín, H., Piqué, R.  
EUETIB, Politechnical University of Catalonia (UPC), Barcelona, Spain

246 ***Switched Reluctance Motor drive for fault-tolerant applications***

J.A. Sánchez, P. Andrada, B. Blanqué, M. Torrent, J.I. Perat  
GAECE, EPS d'Enginyeria de Vilanova i la Geltrú, UPC, Spain

301 ***The Switched Reluctance Generator for Wind Power Conversion***

Pedro Lobato, A. Cruz, J. Silva, A.J. Pires  
Escola Superior de Tecnologia de Setubal, Portugal

348 ***Steady State Performance Evaluation of a Permanent Magnet Synchronous Motor Based on FEA***

Lidija Petkovska, Goga Cvetkovski  
Faculty of Electrical Engineering, Ss. Cyril and Methodius University, Skopje, Macedonia

366 ***Startup and Steady-State Performance of Interior-Permanent Magnet Induction Motors***

Mohammadreza Hassan Zadeh<sup>1</sup>, Arash Kiyomarsi<sup>2</sup>  
<sup>1</sup> Abhar Islamic Azad University, Abhar, Iran  
<sup>2</sup> Isfahan University, Isfahan, Iran



**Friday 1 July 2005**

**ROOM B “Schneider”  
(Salón Marbella)**

**11:45 – 13:15 ORAL SESSION B2**

Area 2: Electrical Energy Systems Management

**Chairman:** Carlos Garrido Suárez

***Trends in Energy Markets and Systems: The Case of Natural Gas and Facility Location Techniques***

- 220 Teresa Nogueira<sup>1</sup>, Zita Vale<sup>1</sup>, Manuel Cordeiro<sup>2</sup>  
<sup>1</sup> GECAD-Polytechnique Institute of Porto, Portugal  
<sup>2</sup> University of Tras-os-Montes e Alto Douro, Vila Real, Portugal

***Critérios de apreciação de medidas de gestão da procura no contexto da regulação do sector eléctrico***

- 289 I Apolinario, N. Felizardo, A. Leite Garcia, P. Oliveira, A. Trinidad  
ERSE Entidade Reguladora dos Serviços Energéticos, Lisboa, Portugal

***Cross-border electricity trading modelling: a market equilibrium approach***

- 309 Félix Fernández-Menéndez, Begoña Vitoriano, Julián Barquín  
Instituto de Investigación Tecnológica, Universidad Pontificia de Comillas de Madrid, Spain

***Risk analysis of fuel and CO<sub>2</sub> prices volatility in electricity generation expansion planning***

- 310 Ignacio Hoyos, Julián Barquín, Efraim Centeno, Juan José Sánchez  
Instituto de Investigación Tecnológica, ICAI, Universidad Pontificia de Comillas, Madrid, Spain

***Evaluation of photovoltaic energy potential in residential buildings***

- 324 Sánchez Fernández, J.A., Herrero Martínez N, García Gutiérrez, P., Fraile Ardanuy J., Fraile Mora J., Wilhelmi Ayza, J.R.  
ETSYCC y P, Universidad Politécnica de Madrid, Spain

**Friday 1 July 2005**

**ROOM C “ABB”  
(Salón Sierra Blanca)**

**11:45 – 13:15 ORAL SESSION C2**

Area 6: Industrial Production, Instrumentation, Control and Robotics

**Chairman:** Santiago Arnaltes Gómez

**282 *Learning Mobile Robotics using Lego Mindstorms***

Paulo Leitão, José Gonçalves, José Barbosa  
Polytechnic Institute of Bragança, Portugal

**283 *Chess Robot System: A Multi-disciplinary Experience in Automation***

José Gonçalves, José Lima, Paulo Leitão  
Polytechnic Institute of Bragança, Portugal

**358 *The OPERA IST Project***

Elisa García, Miguel A. Chileno, Luis Legorburu  
IBERINCO: IBERDROLA Ingeniería y Consultoría, Madrid, Spain

**359 *The Experience of the IBERDROLA Group in Powerline Communications (PLC)***

Elisa García, Miguel A. Chileno, Emilio Vianco  
IBERINCO: IBERDROLA Ingeniería y Consultoría, Madrid, Spain

**386 *Magnetic Field Computation Due to High Voltage Power Lines Using EasyMag***

Tony Richard O. Almeida, Carlos F.R. Lemos Antunes  
Laboratorio de CAD/CAE, Universidade de Coimbra, Portugal

13:30 – 15:30

**LUNCH AT THE SWIMMING POOL RESTAURANT**  
“Hotel Gran Melia Don Pepe”

**Friday 1 July 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

**15:30 – 16:30 PLENARY SESSION PL5**

**Chairman:** Vicente Barranco López

***Política de Ahorro y Eficiencia Energética***

María del Valle Higuera Rabadán

Responsable del Centro de Eficiencia Energética de Unión Eléctrica FENOSA, S.A., España

**16:30 – 17:15 POSTER SESSION D3 – Coffee Break**

**Chairmen:** Juan Manuel Ramirez-Arredondo, María Dolores Gutiérrez Ochoa de Alda, Marina Perdigão

230 ***Determination of Winding Head Leakage Reactance in PMSM(s)***  
J.A. Güemes Alonso, A.M. Iraolagoitia Iriondo  
EUITI, Universidad del País Vasco, Spain

252 ***Measurement of high frequency currents with a Rogowski coil***  
M. Argüeso, G. Robles, J. Sanz  
EPS, Universidad Carlos III de Madrid, Spain

278 ***Simulation and optimisation of an induction cup with moving parts using the 2D/3D finite element method***  
N. Vidal<sup>1</sup>, G. Aguirre-Zamalloa<sup>2</sup>, J.M. Barandiarán<sup>1</sup>, J. Gutiérrez<sup>1</sup>, A.García-Arribas<sup>1</sup>  
<sup>1</sup> Facultad de Ciencia y Tecnología, Universidad del País Vasco, Spain  
<sup>2</sup> ETSII, Universidad del País Vasco, Spain

281 ***Experimental Validation of Photovoltaic Cells Models***  
Nuno Mota<sup>1</sup>, Vital Vilarinho<sup>1</sup>, Nuno Cláudio<sup>1</sup>, E. Margato<sup>1,2</sup>, F. Sales Rodrigues<sup>1</sup>  
<sup>1</sup> Instituto Superior de Engenharia de Lisboa, Portugal  
<sup>2</sup> Instituto Superior Técnico, Universidad Técnica de Lisboa, Portugal

284 ***Instrumentation and Control Strategy of a Linear Switched Reluctance Actuator***  
P.P. Serrano, A.F. Ferreira, A.E. Espírito Santo, M.R.A. Calado, C.M.P. Cabrita  
University of Beira Interior, Covilhã, Portugal

- 286 ***A Graphical and Open Source Matlab-GAMS interface for Electricity Market Models***  
Federico Milano  
ETSII, Universidad de Castilla-La Mancha, Ciudad Real, Spain
- 287 ***Magnetic field reduction screening system for a magnetic field source used in industrial applications***  
H. Beltran, V. Fuster, M. García  
Institut de Tecnologia Eléctrica, Parc Tecnològic de Paterna, Valencia, Spain
- 297 ***Efficiency Improvement of PM Disc Motor Using Genetic Algorithm***  
Goga Cvetkovski<sup>1</sup>, Lidija Petkovska<sup>2</sup>, Sinclair Gair<sup>2</sup>  
<sup>1</sup> Faculty of Electrical Engineering, Ss. Cyril & Methodius University, Skopje, Macedonia  
<sup>2</sup> University of Strathelyde, Scotland, UK
- 298 ***Modelling and Control of a Liquid-level System for Teaching Control Systems in Electrical Engineering***  
Joaquim Soares, Luis Encarnação, José Ribeiro  
Instituto Superior de Engenharia de Lisboa, Portugal
- 302 ***Desarrollo de nuevas estrategias de control del UPFC en redes de media y alta tensión***  
Rogelio Orizondo y Roberto Alves Baraciarte  
Universidad Simón Bolívar, Caracas, Venezuela
- 305 ***Multiobjective Optimisation Approach for Unit Commitment under Emission Allowance Trading***  
J.P.S. Catalão<sup>1</sup>, S.I.P.S. Mariano<sup>1</sup>, V.M.F. Mendes<sup>2</sup>, L.A.M. Ferreira<sup>3</sup>  
<sup>1</sup> Universidade da Beira Interior, Covilhã, Portugal  
<sup>2</sup> Instituto Superior de Engenharia de Lisboa, Portugal  
<sup>3</sup> Instituto Superior Técnico, Lisboa, Portugal
- 322 ***Voltage sag generators for analysing wind generators response***  
S. Martínez, C. Veganzonez, F. Blázquez, N. Herrero, D. Ramírez, C. Platero, J. Rodríguez, J.A. Sánchez  
Universidad Politécnica de Madrid, Spain
- 356 ***3D FEM Simulation Data Applied to ANN to Sensorless Position Estimation and Torque Ripple Minimization in a Switched Reluctance Motor***  
Francisco José Pérez<sup>1</sup>, Abelardo Martínez<sup>1</sup>, Javier Vicuña<sup>2</sup>, Bonifacio Martín<sup>1</sup>, Eduardo Loloya<sup>1</sup>, Tomás Pollán<sup>1</sup>, Beatriz Sánchez<sup>3</sup>, Juan Lladó<sup>3</sup>  
<sup>1</sup> Dpto. de Ing. Electrónica y Comunicaciones, Univ. De Zaragoza, Spain  
<sup>2</sup> Dpto. de Ingeniería Eléctrica, Univ. De la Rioja, Spain  
<sup>3</sup> Dpto. de Ingeniería Eléctrica, Univ. De Zaragoza, Spain
- 365 ***Fuzzy Model based on 3D FEM Simulation Data applied to Torque Ripple Minimization in a Switched Reluctance Motor***  
J. Vicuña<sup>1</sup>, A. Martínez-Iturbe, F. Pérez-Cebolla, B. Martín del Brío, E. Laloya, T. Pollán, J. Lladó<sup>2</sup>, B. Sánchez-Tabuenca<sup>2</sup>  
<sup>1</sup> Dpto. de Ingeniería Eléctrica, ETSII, Universidad de La Rioja, Spain  
<sup>2</sup> Universidad de Zaragoza, España

- Hardware in a Loop para el ensayo de convertidores de frecuencia de 400V**  
 376 J. Bergas<sup>1</sup>, M. Teixidó<sup>1</sup>, Q. López<sup>1</sup>, S. Galceran<sup>2</sup>, J. Sánchez<sup>3</sup>  
<sup>1</sup> CITCEA-Universitat Politècnica de Catalunya, Barcelona, Spain  
<sup>2</sup> Dpto. de Ingeniería Eléctrica, ETSEIB, UPC, Barcelona, Spain  
<sup>3</sup> FECSA-ENDESA, Dirección de Explotación y Calidad de Suministro, Barcelona, Spain
- Comparación de métodos de cálculo de la ampacidad en conductores aéreos tipo ACSR**  
 389 Carlos Garrido Suárez, Antonio Fernández Otero, Andrés Feijóo Lorenzo  
 ETSII, Universidad de Vigo, España
- Calculation of electromagnetic torque of a induction motor with broken rotor bar by Finite Element Method**  
 391 C. Rojas, M. Melero, J. Cano, M. Cabanas, G. Orcajo, F. Pedrayes  
 EPS de Ingeniería de Gijón, Universidad de Oviedo, Spain
- Transient Stability Critical Machines Set Identification using a Hybrid Method**  
 392 C.M. Machado Ferreira<sup>1</sup>, J.A. Dias Pinto<sup>1</sup>, F.P. Maciel Barbosa<sup>2</sup>  
<sup>1</sup> ISEC, Instituto Superior de Engenharia de Coimbra, Portugal  
<sup>2</sup> FEUP, Faculdade de Engenharia da Universidade do Porto
- Influence of Severity indices in the Security Analysis of an Electric Power System**  
 393 C.I. Faustino Agreira<sup>1</sup>, C.M. Machado Ferreira<sup>1</sup>, J.A. Dias Pinto<sup>1</sup>, F.P. Maciel Barbosa<sup>2</sup>  
<sup>1</sup> ISEC, Instituto Superior de Engenharia de Coimbra, Portugal  
<sup>2</sup> FEUP, Faculdade de Engenharia da Universidade do Porto, Portugal
- Definição e Análise de Contigências Severas na Rede Eléctrica Nacional**  
 397 Susana Almeida<sup>1</sup>, Rui Pestana<sup>1</sup>, F. Maciel Barbosa<sup>2</sup>  
<sup>1</sup> REN – Rede Eléctrica Nacional, S.A., Portugal  
<sup>2</sup> FEUP, Faculdade de Engenharia da Universidade do Porto, Portugal
- Asignación Horaria de Costos Complementarios del Sistema de Transmisión utilizando Teoría de Juegos**  
 400 H.M. Khordr<sup>1</sup>, P.M. De Oliveira-De Jesús<sup>2</sup>, J.M. Yusta-Loyo<sup>3</sup>  
<sup>1</sup> Universidad Simón Bolívar, Caracas, Venezuela  
<sup>2</sup> FEUP, Faculdade de Engenharia da Universidade do Porto, Portugal  
<sup>3</sup> Centro Politécnico Superior, Universidad de Zaragoza, España
- Power Quality Considerations: Measurements at a Sawmill**  
 404 M. Pérez Donsión<sup>1</sup>, F. Oliveira<sup>2</sup>, A. Madureira<sup>3</sup>  
<sup>1</sup> Department of Electrical Engineering, E.T.S.I.I., University of Vigo, España  
<sup>2</sup> Polytechnic Institute of Leiria, Portugal  
<sup>3</sup> Power Systems Unit of INESC Porto, Portugal

Friday 1 July 2005

ROOM A "Unión Fenosa"  
(Salón Bellavista)

**17:15 – 18:45 ORAL SESSION A3**

Area 1: Electrical Energy Systems Analysis

Chairman: Zita Almeida do Vale

**227 *Modelling of Lightning Transient Overvoltage by Using Different Models of Grounding System***

B. Vahidi, R. Shariati Nassab, S. Ghahghahe Zadeh, A.A. Khaniki  
Amirkabir University of Technology, Tehran, Iran

**234 *Neural network based fault locator prototype for real time operation***

A.J. Mazón, I. Zamora, V. Valverde, E. Torres, I. Albizu  
ETSII de Bilbao, Universidad del País Vasco, Spain

**238 *Autonomous System with Photovoltaic Conversion, Battery Storage and Supply on Single Phase Alternated Voltage***

Nuno Mota<sup>1</sup>, Vital Vilarinho<sup>1</sup>, Nuno Claudio<sup>1</sup>, F. Sales Rodrigues, E. Margato<sup>1,2</sup>  
<sup>1</sup> Instituto Superior de Engenharia de Lisboa, Portugal  
<sup>2</sup> Instituto Superior Técnico, Universidad Técnica de Lisboa, Portugal

**245 *Transmission and Distribution Networks: AC versus DC***

D.M. Larruskain<sup>1</sup>, I. Zamora<sup>1</sup>, A.J. Mazón<sup>1</sup>, O. Abarategui<sup>1</sup>, J. Monasterio<sup>2</sup>  
<sup>1</sup> University of the Basque Country, Bilbao, España  
<sup>2</sup> Avnet Iberia S.A.U., Spain

**272 *New regulatory aspects for grid-connected photovoltaic systems in Spain***

José Alberto Santana Rodríguez<sup>1</sup>, Jorge Muñoz Estrada<sup>1</sup>, Francisco David Trujillo Aguilera<sup>1</sup>, Francisco José Ruiz Sánchez<sup>2</sup>, Carlos María Fernández Romero<sup>2</sup>  
<sup>1</sup> Escuela Universitaria Politécnica, Universidad de Málaga, Spain  
<sup>2</sup> Empresa Municipal Aguas de Málaga, S.A., Spain

Friday 1 July 2005

ROOM B "Schneider"  
(Salón Marbella)

**17:15 – 18:45 ORAL SESSION B3**

Area 4: CAD/CAE Techniques and Simulation

**Chairman:** Francisco Arcega Solsona

***Generation System Reliability Including Natural Gas System Constraints using Monte Carlo Methods***

- 271 Jorge Muñoz-Estrada<sup>1</sup>, Noemi Jiménez-Redondo<sup>1</sup>, Juan Pérez-Ruiz<sup>1</sup>, Julián Barquín-Gil<sup>2</sup>  
<sup>1</sup> ETSII, Universidad de Málaga, Spain  
<sup>2</sup> ETSII, Universidad Pontificia de Comillas, Madrid, Spain

***The phasor representation of power in the analysis of single phase AC circuits***

- 295 G. Aguirre-Zamalloa<sup>1</sup>, N. Vidal-Lekue<sup>2</sup>  
<sup>1</sup> Dpto. de Ingeniería Eléctrica, ETSIB, Universidad del País Vasco, Spain  
<sup>2</sup> Dpto. de Electricidad y Electrónica, Universidad del País Vasco, Spain

***Simulación de cuencas hidráulicas mediante Programación Orientada a Objetos***

- 303 Jesús M<sup>a</sup>. Latorre<sup>1</sup>, Santiago Cerisola<sup>1</sup>, Andrés Ramos<sup>1</sup>, Alejandro Perea<sup>2</sup>, Rafael Bellido<sup>2</sup>  
<sup>1</sup> Instituto de Investigación Tecnológica, Universidad Pontificia Comillas de Madrid, España  
<sup>2</sup> Iberdrola Generación, Madrid, España

***Solución Explícita de las Ecuaciones en Variables de Estado de Circuitos LTI***

- 355 Alfonso Bachiller Soler, José A. Rosendo Macías, Antonio Gómez Expósito  
E.T.S. Ingenieros, Universidad de Sevilla, España

***Low Frequency Electromagnetic Fields In Power Transformer Rooms***

- 379 Tony Richard O. Almeida, A. Paulo Coimbra, Carlos F.R. Lemos Antunes  
Laboratorio de CAD/CAE, Universidade de Coimbra, Portugal

**Friday 1 July 2005**

**ROOM C “ABB”**  
(Salón Sierra Blanca)

**17:15 – 18:45 ORAL SESSION C3**

Area 5: Electrical Installations

**Chairman:** Manuel Castilla Ibañez

***Influence of Decentralized Generation and Network Configuration  
in the Harmonic Pollution in an Electric Power System***

275 M.F. Coelho Monteiro<sup>1</sup>, J.A. Dias Pinto<sup>1</sup>, A.C.S. Machado e Moura<sup>2</sup>

<sup>1</sup> Instituto Superior de Engenharia de Coimbra, Portugal

<sup>2</sup> Faculdade de Engenharia da Universidade do Porto, Portugal

***Ahorro energético en instalaciones de iluminación***

335 Antonio Pulido Alonso, Javier Cruz Norro, Felipe Díaz Reyes  
ETSII, Universidad de Las Palmas de Gran Canaria, Las Palmas, España

***Retribución de la distribución de energía eléctrica en España. Caso  
Actual VS. Yardstick Competition***

378 R. Ramirez<sup>1</sup>, A. Sudrià<sup>1</sup>, J. Bergas<sup>1</sup>, G. Tevar<sup>2</sup>

<sup>1</sup> CITCEA-Universitat Politècnica de Catalunya, Barcelona, España

<sup>2</sup> FECSA-ENDESA, Dirección de Explotación y Calidad de Suministro, Barcelona, España

***Power Quality Monitoring in Distribution Systems***

385 S. Herrainz<sup>1</sup>, J. Meléndez<sup>1</sup>, J. Colomer<sup>1</sup>, Marc Vinyoles<sup>1</sup>, J. Sánchez<sup>2</sup>, M. Castro<sup>2</sup>

<sup>1</sup> eXiT Group, EPS University of Girona, Spain

<sup>2</sup> Endesa Distribución Eléctrica SLU, Spain

***A criação de valor no binómio: “casa inteligente”/consumidor***

394 António Manuel L. Quadros Flores  
ISEC, Instituto Superior de Engenharia do Porto, Portugal

20:00 – 1:00

**GALA DINNER**  
*Fortuna Show Room, Torrequebrada Casino  
Benalmádena*



**Saturday 2 July 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

**9:30 – 10:30 PLENARY SESSION PL6**

**Chairman:** Francisco Pérez Hidalgo

***The CableCURE Technology for Revitalization of “Water Tree” Damaged Medium Voltage Cables***

Siegmar Vogel  
CableCURE, Germany

**10:30 – 11:15 POSTER SESSION D4 – Coffee Break**

**Chairmen:** Ivo Dolezel, Elmano Margado, L. Fernando Mantilla Peñalva.

***Methods For Pricing Inter-Area Electricity Trades***

239 Judite Ferreira, Zita Vale  
Instituto Politécnico do Porto (IPP)/(ISEP), Portugal

***Detecção do Ponto de Colapso Usando o Novo Método FSQV***

277 António C. Andrade<sup>1</sup>, F.P. Maciel Barbosa<sup>2</sup>  
<sup>1</sup>Instituto Superior de Engenharia do Instituto Politécnico do Porto, Portugal  
<sup>2</sup>Faculdade de Engenharia da Universidade do Porto, Portugal

***Ballast Load Hydroelectric Frequency Regulation by Jeans of Industrial Embedded PC***

291 Leonardo Peña Pupo<sup>1</sup>, Hugo Domínguez Abreu<sup>1</sup>, Julio Fong Barrio<sup>1</sup>, Juan Antonio García-Alzórriz Pardo<sup>2</sup>, Antoni Sudriá Abreu<sup>2</sup>  
<sup>1</sup>Facultad de Ingeniería Eléctrica, Universidad de Oriente, Cuba  
<sup>2</sup>ETSII, Universidad Politécnica de Cataluña, Barcelona, Spain

***Modelo predictivo para la determinación de contaminación salina en aisladores eléctricos***

300 J. Carmelo Quintana Suárez, Miguel Martínez Melgarejo, Jesús Romero Mayoral, Miguel A. Quintana Suáres, Felipe Díaz Reyes, Javier Cruz Norro.  
Universidad de Las Palmas de Gran Canaria, España.

***Remote Alarm and Command System for Residential Domotics Trough GSM-SMS***

312 Mafalda Seixas<sup>1</sup>, João Palma<sup>1,2</sup>  
<sup>1</sup>Instituto Superior de Engenharia de Lisboa, Portugal  
<sup>2</sup>Laboratório Nacional de Engenharia Civil, CIC, Lisboa, Portugal

- Control Tasks in a Water Flow Measurement Section of a Hydraulics Laboratory**
- 320 Armando Cordeiro<sup>1,3</sup>, João Palma<sup>2</sup>, José Maia<sup>1,3</sup>, Jorge Esteves<sup>3,4,5</sup>  
<sup>1</sup> Escola Superior de Tecnologia de Setúbal, Portugal  
<sup>2</sup> Laboratório Nacional de Engenharia Civil, CIC, Lisboa, Portugal  
<sup>3</sup> Centro de Automática da Universidade Técnica de Lisboa, Portugal  
<sup>4</sup> Instituto Superior de Engenharia de Lisboa, Portugal  
<sup>5</sup> Entidade Reguladora dos Serviços Energéticos, Portugal
- Actuaciones correctoras para el control de tensiones en redes de distribución y de los flujos de potencia reactiva en los transformadores transporte/distribución**
- 325 Angel Luis Trigo García, José Luis Martínez Ramos, Antonio de la Villa Jaén, Alejandro Marano Marcolinni y Jesús Riquelme Santos  
 Escuela Superior de Ingenieros, Universidad de Sevilla, España
- Optimización del funcionamiento de una planta de cogeneración para su inclusión en el mercado liberalizado de electricidad**
- 329 J. M<sup>a</sup>. Maza Ortega<sup>1</sup>, J. Jiménez Calle<sup>1</sup>, J. L. Martínez Ramos<sup>1</sup>, Enrique Mora García<sup>2</sup>  
<sup>1</sup> Escuela Superior de Ingenieros, Universidad de Sevilla, España  
<sup>2</sup> Linasa Cogeneración y Asociados, S.L., Murcia, España
- Procedimiento para alejar el sistema del colapso de tensiones utilizando técnicas de optimización y análisis de sensibilidad**
- 330 Alejandro Marano Marcoloni, José Luis Martínez Ramos, Angel L. Trigo, Pedro Martínez Lacañina  
 Dpto. de Ingeniería Eléctrica, Universidad de Sevilla, España
- Classification of faults in double circuit lines using Wavelets and Neural Networks**
- 331 Francisco Martín, José A. Aguado, José Muñoz, Manuel Medina  
 Dpto. De Ingeniería Eléctrica, ETSII, Universidad de Málaga, Spain
- A Simple PID Controller with Adaptive Parameter in a dsPIC; Case of Study**
- 337 João Chaiño, Pedro Pereira, Silviano Rafael<sup>1</sup>, A.J. Pires<sup>1</sup>  
<sup>1</sup> Escola Superior de Tecnologia, Instituto Politécnico de Setúbal, Portugal
- Electronic Accelerator Control in VEIL**
- 340 Frederico Santos, João Pedro Trivão, António Luís Marques  
 Instituto Superior de Engenharia de Coimbra, Coimbra, Portugal
- Modern Technologies Applied in Experimental Education on Electrical Drives**
- 341 Paulo Gambôa<sup>1,2</sup>, José Faria<sup>1,2</sup>, Elmano Margato<sup>1,2</sup>, João Palma<sup>1,3</sup>  
<sup>1</sup> Instituto Superior de Engenharia de Lisboa, Lisboa, Portugal  
<sup>2</sup> Instituto Superior Técnico, Lisboa, Portugal  
<sup>3</sup> Laboratório Nacional de Engenharia Civil, Lisboa, Portugal
- Estimation and Allocation of Losses in Distribution Networks**
- 350 J.N. Fidalgo, Manuel Matos, Marco Marques  
 INESC-Porto – Instituto de Engenharia da Universidade do Porto  
 FEUP – Faculdade de Engenharia da Universidade do Porto, Portugal

- Review of Gas Turbine Models for Power System Stability Studies**  
 P. Centeno<sup>1</sup>, I. Egido<sup>1</sup>, C. Domingo<sup>1</sup>, F. Fernández<sup>1</sup>, L. Rouco<sup>1</sup>, M. González<sup>2</sup>  
 368 <sup>1</sup> Instituto de Investigación Tecnológica, ETSII - ICAI, Universidad Pontificia de Comillas de Madrid, Spain  
<sup>2</sup> Endesa Generación, Dirección de Ingeniería e I+D, Subdirección de Ingeniería, Área Eléctrica y Control, Madrid, Spain
- A Centralized Load Shedding Scheme for Small Isolated Power Systems**  
 J. Rodríguez<sup>1</sup>, M. González<sup>1</sup>, J.R. Diago<sup>1</sup>, C. Domingo<sup>2</sup>, I. Egido<sup>2</sup>, P. Centeno<sup>2</sup>, F. Fernández<sup>2</sup>, L. Rouco<sup>2</sup>  
 369 <sup>1</sup> Endesa Generación, Dirección de Ingeniería e I+D, Subdirección de Ingeniería, Área Eléctrica y Control, Madrid, Spain  
<sup>2</sup> Instituto de Investigación Tecnológica, ETSII - ICAI, Universidad Pontificia de Comillas de Madrid, Spain
- Analysis of the magnetic field of a High-Voltage power line**  
 373 R. Moreno, J.A. Güemes, I. Pico  
 EUITI, University of the Basque Country, Spain
- Índices de continuidad en redes de distribución y su mejora**  
 377 A. Sumper<sup>1</sup>, A. Sudrià<sup>1</sup>, R. Ramirez<sup>1</sup>, R. Villafáfila<sup>1</sup>, Mircea Chindris<sup>2</sup>  
<sup>1</sup> CITCEA-Universitat Politècnica de Catalunya, Barcelona, España  
<sup>2</sup> Technical University of Cluj-Napoca, Romania
- Web Controlled Robotic Arm**  
 381 António Luís Marques, Verónica Vasconcellos, João Perdigoto, Samuel Pereira, Ricardo Oliveira  
 Instituto Superior de Engenharia de Coimbra, Portugal
- WINDIRIGÍVEL – Controlo de um Dirigível Autónomo Robotizado**  
 382 Paulo Brígida, A. Paulo Coimbra, Manuel Crisóstomo  
 Instituto de Sistemas e Robótica, Universidad de Coimbra, Portugal
- Analysis of Micro Generation Impacts in Distribution Networks**  
 383 Susana Silva, J.N. Fidalgo, J.A. Peças Lopes  
 INESC Porto, Instituto de Engenharia de Sistemas e Computadores, FEUP-Faculdade de Engenharia da Universidade do Porto, Portugal
- Controlo de um Robô Bípede com base em sensores de força nos pés**  
 390 João Paulo Ferreira<sup>1</sup>, Manuel Crisóstomo<sup>2</sup>, A. Paulo Coimbra<sup>2</sup>  
<sup>1</sup> Instituto Superior de Engenharia de Coimbra, Portugal  
<sup>2</sup> Instituto de Sistemas e Robótica, Universidade de Coimbra, Portugal

**Saturday 2 July 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

**11:15 – 12:45 ORAL SESSION A4**

Area 3: Electrical Machines and Power Electronics

**Chairman:** José Roger Folch

***Analysis of voltage control for a self-excited induction generator using a three-phase four-wire electronic converter***

232 José Antonio Barrado<sup>1</sup>, Robert Griñó<sup>2</sup>  
<sup>1</sup> ETSE, Universitat Rovira I Virgili, España  
<sup>2</sup> ETSEIB, Universitat Politècnica de Catalunya, Spain

***Establecimiento de un protocolo de ensayos normalizados para el estudio del ruido aéreo emitido por máquinas eléctricas rotativas***

254 Lara Raya, Fco. Ramón<sup>1</sup>, Serrano Lorenzo-Arroyo, Antonio<sup>1</sup>, Barranco López, Vicente<sup>1</sup>, Pérez Hidalgo, Fco. Manuel<sup>2</sup>  
<sup>1</sup> EPS, Universidad de Córdoba  
<sup>2</sup> Dpto. de Ingeniería Eléctrica, Universidad de Málaga

***Sensorless Control of Doubly-fed Asynchronous Machines for WECS Applications***

279 Eloy-García Carrasco, J, Arnaltes Gómez, S., Rodríguez Amenedo, J.L.  
EPS, Universidad Carlos III de Madrid, Spain

***Doubly Fed Induction Generator Systems For Variable Speed Wind Turbine***

296 Rui Melício, V.M.F. Mendes  
ISEL DEEA, Secção de Economia e Gestão, Lisboa, Portugal

***Bearing Failures Diagnosis in Three-Phase Induction Motors***

311 José L.H. Silva<sup>1</sup>, A.J. Marques Cardoso<sup>2</sup>  
<sup>1</sup> Escola Superior de Tecnologia de Viseu, Portugal  
<sup>2</sup> Universidad de Coimbra, Portugal

**Saturday 2 July 2005**

**ROOM B “Schneider”  
(Salón Marbella)**

**11:15 – 12:45 ORAL SESSION B4**

Area 2: Electrical Energy Systems Management

**Chairman:** Inmaculada Zamora Bellver

**251 *A Data Mining Decision Support Tool to Study Electricity Retail Contracts***

Vera Figueiredo, Fátima Rodrigues, Ricardo Pinto, Zita Vale  
GECAD, ISEP – Polytechnic Institute of Porto, Portugal

**269 *Electrical customers classification through the use of several artificial Neural Networks techniques, and identification of new customers with the trained nets***

S. Valero<sup>1</sup>, M. Ortiz<sup>1</sup>, C. Senabre<sup>1</sup>, M. Peñarrubia<sup>1</sup>, A. Gabaldón<sup>2</sup>, Fco. García<sup>2</sup>  
<sup>1</sup> Universidad Miguel Hernández, Elche, Spain  
<sup>2</sup> Universidad Politécnica de Cartagena, Spain

**288 *Optimum Electrical Energy Procurement in a Deregulated Market for a Repair and Conversion Shipyard***

Marcos Toscano Bonilla<sup>1</sup>, José Luis Martínez Ramos<sup>2</sup>, Manuel Burgos Payan<sup>2</sup>  
<sup>1</sup> Navantía, S.L., Cádiz, Spain  
<sup>2</sup> ESI, Universidad de Sevilla, Spain

**293 *Localização adequada de períodos horários para efeitos tarifários Aplicação ao sistema eléctrico de Portugal Continental***

I Apolinário, N. Felizardo, A. Leite García, P. Oliveira, A. Trindade, J. Vasconcelos, P. Verdelho  
ERSE Entidade Reguladora dos Serviços Energéticos, Lisboa, Portugal

**304 *A Fuzzy-Logic Based Modelling of Strategic Bidding in Double-Sided Electricity Auctions***

M. Mohammadi<sup>1,2</sup>, Ashkan Rahimi-Kian<sup>3</sup>, G.B. Gharehpetian<sup>2</sup>  
<sup>1</sup> Islamic Azad University, Kazeroon, Iran  
<sup>2</sup> Amirkabir University of Technology, Tehran, Iran  
<sup>3</sup> University of Tehran, Iran

**Saturday 2 July 2005**

**ROOM C "ABB"**  
(Salón Sierra Blanca)

**11:15 – 12:45 ORAL SESSION C4**

Area 4: Industrial Production, Instrumentation, Control and Robotics

**Chairman:** Ramón Bargallo Perpiña

***Levitation Heating as a Multiparametric Coupled Problem***

M. Mach<sup>1</sup>, J. Nečesaný<sup>2</sup>, I. Doležel<sup>3</sup>

223 <sup>1</sup> Faculty of Electrical Engineering, University of West Bohemia in Plzen, Czech Republic

<sup>2</sup> Institute of Electrical Engineering Academy of Sciences of the Czech Republic, Praha

<sup>3</sup> Faculty of Electrical Engineering, Czech Technical University in Praha, Czech Republic

***Optimal screen width for field reduction applications of low frequency magnetic fields in three-phase conductors***

236 H. Beltran<sup>1</sup>, V. Fuster<sup>1</sup>, C. García<sup>2</sup>, V. Ferrer<sup>1</sup>, I. Piqueras<sup>1</sup>

<sup>1</sup> Institut de Tecnologia Elèctrica, Valencia, Spain

<sup>2</sup> UNIÓN FENOSA – Distribución, La Coruña, Spain

***Computation of Low-Frequency Electric Fields in Analysis of Electromagnetic Field Exposure***

259 Željko Štih, Bojan Trkulja, Sead Berberović

Faculty of Electrical Engineering and Computing, Univ. of Zagreb, Croatia

***A dynamic model of adjustable speed hydro plants***

321 J. Fraile-Ardanuy, J.R. Wilhelmi, J. Fraile-Mora, J.I. Pérez, I. Sarasua

ETSYCC y P, Universidad Politécnica de Madrid, Spain

***Electronic Ballast with Wide Dimming Range: Matlab-Simulink Implementation of a Double Exponential Fluorescent-Lamp Model***

398 Marina Perdigão<sup>1</sup>, E.S. Saraiva<sup>2</sup>

<sup>1</sup> ISEC, Instituto Superior de Engenharia de Coimbra, Portugal

<sup>2</sup> Faculdade de Ciências e Tecnologia da Universidade de Coimbra, Portugal

**Saturday 2 July 2005**

**ROOM A “Unión Fenosa”  
(Salón Bellavista)**

12:45 – 13:15	<b>Conclusions and time for the next congress (XCLEEE)</b>
13:30 – 15:30	<b>FAREWELL LUNCH AT THE SWIMMING POOL RESTAURANT</b> “Hotel Gran Melia Don Pepe”



**Asociación Española  
para el Desarrollo  
de la Ingeniería Eléctrica**

## **AEDIE**

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## COMPANIONS PROGRAMME 9CHLIE

<b>Thursday 30 June 2005</b>	
10:00 – 13:00	<b>Registration</b>
15:30	Departure of the bus from the “Hotel Gran Melia Don Pepe”
15:30-21:00	<b>Trip and visit to Puerto Marina, Mijas and Puerto Banus</b>
21:00	Arrival of the bus at “Hotel Gran Melia Don Pepe”
21:00 - 23:00	<b>WELCOME DINNER AT THE SWIMMING POOL RESTAURANT</b> “Hotel Gran Melia Don Pepe” entertained by a Spanish Guitarrist

<b>Friday 1 July 2005</b>	
8:30	Departure of the bus from the “Hotel Gran Melia Don Pepe”
8:30 – 13:30	<b>Trip and visit to Málaga</b>
13:30	Arrival of the bus at “Hotel Gran Melia Don Pepe”
13:30 – 15:30	<b>LUNCH AT THE SWIMMING POOL RESTAURANT</b> “Hotel Gran Melia Don Pepe”
15:30 – 16:30	<b>Trip and visit to the old town of Marbella</b>
16:30 – 19:00	<b>FREE TIME</b>



19:00	Departure of the buses from the "Hotel Gran Melia Don Pepe"
20:00 – 1:00	<b>GALA DINNER</b> <i>Fortuna Show Room, Torrequebrada Casino Benalmádena</i>
1:00	Departure of the buses from Torrequebrada Casino

**Note:** The Fortuna Show Room is unique in the Costa del Sol and is host to a fascinating Flamenco Show by Carmen Mota plus a spectacular International Show by José Montes.

At the end of the Gala Dinner and the show we will deliver a silver plate or similar to the most important sponsors. This companies are: UNIÓN FENOSA, SCHNEIDER ELECTRIC, ABB and CIRCUTOR. Also we will deliver the gold medal of AEDIE to Antonio Almeida do Vale and Luis Humet Coderch great collaborators with the organization of the "Jornadas Hispano Lusas de Ingeniería Eléctrica" that were the bases of the actual "Spanish Portuguese Congress on Electrical Engineering"

First we will have an aperitif "Spanish Wine" at the Terrace after that the dinner, the spectacle and then the interesting people could pay a short and free visit to the Casino. For to visit the casino you will need the DNI or passport.

<b>Saturday 2 July 2005</b>	
8:30	Departure of the bus from the "Hotel Gran Melia Don Pepe"
8:30 – 13:30	<b>Trip and visit to Ronda</b>
13:30	Arrival of the bus at "Hotel Gran Melia Don Pepe"
13:30 – 15:30	<b>FAREWELL LUNCH AT THE SWIMMING POOL RESTAURANT</b> "Hotel Gran Melia Don Pepe"

**Thursday 30 June 2005**

**Trip and visit to Puerto Marina, Mijas and Puerto Banus**

15:30 Departure of the bus from the “Hotel Gran Melia Don Pepe”

**Puerto Marina**, the port of Benalmadena which is at the extreme eastern end of the town, bordering on Torremolinos, has been described as 'the best marine'. While this is a disputable claim it certainly is modern, attractive, unrivalled ambience. There are over 1000 berth points and 200 restaurants plus a new shopping centre. The architecture has Andalusia and Indian influences. Many annual activities take place here as well including the international fishing tournaments.

**Mijas**. This was a fortress town created by the Romans, 425m above the sea level and dominating the coast from its privileged position on the top of Sierra de Mijas. Behind the village is the Mendoza peak rising up 1150 m. There are a lot of restaurants, bars and craft shops, a tiny bullring a bullfight museum, horse & carriage rides and 'burro taxi' (donkey). You can visit the 'Ermita del Puerto' a little church on the mountainside above the town.

**Puerto Banus** is located just west of Marbella, before you reach the small town of San Pedro de Alcántara and is the meeting-point of the jet-set in Marbella, here you'll find the most beautiful yacht, the most elegant shops and the best restaurants. The shiningly white buildings make a fine contrast with the dark blue sea- a pleasure for the eyes. This is the place to be pampered yacht side and ogle those fabulous luxury yachts while sipping a drink at one of the many open air restaurants and bars.

Nightlife buzzes at Puerto Banus with your choice of alfresco bars, piano clubs and discos while during the day this is a window shopper's dream with several of world renowned fashions houses featured here, in addition to small, interesting shops and boutiques.

21:00 Arrival of the bus at “Hotel Gran Melia Don Pepe”

21:00 - 23:00

**WELCOME DINNER AT THE SWIMMING POOL RESTAURANT**

“Hotel Gran Melia Don Pepe”

**Entertained by a Spanish Guitarist**

## Friday 1 July 2005 Trip and visit to Málaga

8:30 Departure of the bus from the “Hotel Gran Melia Don Pepe”

**Málaga** is the major coastal city of Andalusia. The Moors occupied the city until the mid fifteenth century. This illustrious past has left its imprint on the historic centre, particularly around La Alcazaba, a fortress which dates back to 1065 and is now a archaeological museum.

Pablo Picasso is the city's famous son (not counting Antonio Banderas of course!) and there are several galleries showing his work, including the 16th century Museum of Fine Arts, adjacent to the Cathedral. His birthplace in Plaza de la Merced is today an archive of his life and works and open to the public; the entrance is absolutely free.

The Malagueños love their food and the bars and restaurants here are where the real social life takes place. The choice is unlimited and, on the whole, reasonable with some bars offering a menu of the day. 'Tapas', small portion of many dishes is an Andalusian tradition and a wonderfully inexpensive way to try a variety of local food. The best known local fare in Málaga is 'pescaito frito', an assortment of fried fish, including small sardines and red mullet, best washed down with a glass of ice cold 'fino' at one of the many old fashioned bodegas in town.

**La Manquita**, Málaga's 16th-century cathedral is situated at the centre of the old town on the site of the former main Mosque. Construction of the cathedral began in 1528 and continued for several centuries. During the mid 18th century funds for building the second tower ran out and the project was never completed, giving the cathedral the nickname of 'La Manquita' ('the one-armed one'). The cathedral has been declared a national monument and includes striking features such as the richly ornamented choir stall by Ortiz, Mena and Michael.

**La Alcazaba**, An ancient Moorish Palace built between during the 9th and 10th centuries, Alcazaba is a short distance from the city centre. Its major attraction is a display of Phoenician, Roman and Moorish artefacts in the Museo Arqueológico, but the trip to the palace is well worth making just for the views it gives of the city and bay below. The palace is connected, via a long rampart, to a 14th century Moorish Castle, the Castillo de Gibralfaro, which was originally built as a mosque but later became a Christian church and finally a military enclosure.

13:30 Arrival of the bus at “Hotel Gran Melia Don Pepe”

13:30 – 15:30 **LUNCH AT THE SWIMMING POOL RESTAURANT**  
“Hotel Gran Melia Don Pepe”

15:30 – 16:30 **Trip and visit to the old town of Marbella**  
16:30 – 19:00 **FREE TIME**

**Saturday 2 July 2005**

**Trip and visit to Ronda**

8:30 Departure of the bus from the “Hotel Gran Melia Don Pepe”

**Ronda** is one of Andalusia's loveliest towns, steeped in history. Ronda is located 60 km from Málaga. The road winds up through the mountains of the Sierra Bermeja, and the descends into the Serranía de Ronda and the town itself. It stands on a towering plateau in the mountains of Málaga Province, which made it impregnable to the Christian armies until the very last years of the Reconquest, and is famous through Spain for the plunging river gorge which divides the medieval from the 18th century parts of the town. This gorge is known as 'El Tajo' -The Cliff and is spanned by a stone bridge which is known as 'Puente Nuevo' - New Bridge, which is the chief landmark for all itineraries and which one housed a prison. Ronda is the quarter to the North of the gorge, called 'El Mercadillo', with the 'Plaza de España', the site of Ronda's recently built 'Parador', the spectacular walkway along the river gorge with superb views of the countryside below. This walkway leads to Ronda's lovely 'Mirador', with colourful flower beds and a railing for sightseers to lean against as the gaze into the distance. Visitors love to peer down into the gorge, to see the waters of the River Guadaleví.

You can walk from Plaza de España and the bullring up the Calle Nueva, Ronda's pedestrian shopping district, where some of the shops still retain their traditional appearance and style. It is very popular with day-trippers from the Costa del Sol, and has a wide range of cafés and restaurants. However, it retains all of its traditional charm and languid atmosphere.

Ronda is also famous for its bullring, the oldest and the most beautiful one in Spain; the 'arena' itself is also the country's largest. When there are no fights the bullring is open to visitors and it has a fascinating museum with many mementos of Spain's most renowned bullfighters. Ronda's famous bullring, made famous in the 18th century by a local bullfighter, the legendary Pedro Romero, who killed over 5,000 bulls during his career.

13:30

Arrival of the bus at “Hotel Gran Melia Don Pepe”

13:30 – 15:30

**FAREWELL LUNCH AT THE SWIMMING POOL  
RESTAURANT**  
“Hotel Gran Melia Don Pepe”