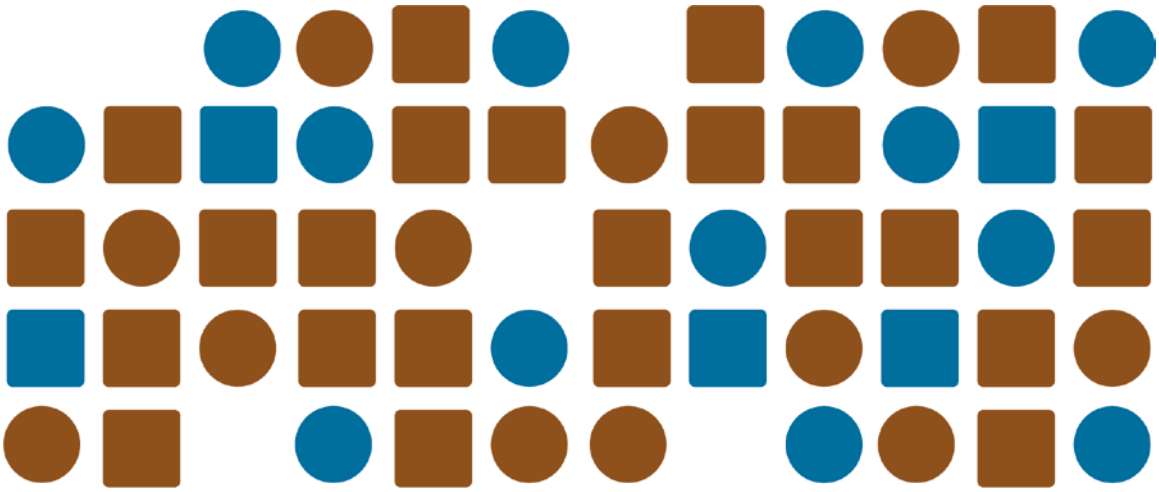


IOC

Institute of Industrial and Control Engineering

Activities Report 2014

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Institut d'Organització i Control
de Sistemes Industrials

Table of contents

1. Director's presentation

This report provides some basic information about the Institute of Industrial and Control Engineering (IOC) and a brief summary of the activity performed during the year 2014. I hope this information is of interest to those who are familiar with the Institute and its background as well as to anyone who wishes to find out more about the IOC by reading this report.

During the year 2014 there have been several changes at UPC and more are still to come, in part due to the new government board that started its activity by the end of 2013. The economic situation have not improved but at least has stopped going worse, as it was the case in the previous recent years. Now, things are more stable and we look forward for a better situation. The Institute has continued with its serious research work, and in 2014 increased the income obtained through competitive projects and agreements with companies, but, on the other side, it scientific production -according to the UPC criteria- has decreased with respect to 2013, when the IOC reached its highest mark; nevertheless, the scientific production was still on the average of the previous years.

One of the most significant changes in the IOC in 2014 was due to the creation of a new administrative unit to centralize the administrative work of several departments and research institutes in the field of engineering in the South Campus of UPC in Barcelona. Consequently, the administrative staff of the IOC was moved to the new unit and, even when this has been previously announced and it was carefully studied and prepared, a number of activities and working procedures had to be adjusted, requiring an extra effort not always in time to avoid some (fortunately minor) disturbances. We are still trying to get used to the new situation.

Despite the hard times of the last years, the Institute seems to be working properly in all its duties, and we look forward with optimism for further improvements.

Raúl Suárez Feijóo

Director

Barcelona, june 18, 2015

2. Organisational structure and governing bodies

Management

Director	RAÚL. SUÁREZ FEIJÓO
Assistant director	ERNEST BENEDITO BENET
Secretary	ARNAU DÒRIA CEREZO
Administrator	CARME MARTÍNEZ VILOR (until 30/09/2014)
Technical and Management Support Area - UTGAEIB	ANA BELÉN CORTINAS ABAD (since 1/10/2014)

The Board

Director	RAÚL. SUÁREZ FEIJÓO
Assistant director	ERNEST BENEDITO BENET
Secretary	ARNAU DÒRIA CEREZO
Representative of the Control division	DOMINGO BIEL SOLÉ
Representative of the Industrial Engineering and Logistics division	RAFAEL PASTOR MORENO
Representative of the Robotics division	LUÍS BASAÑEZ VILLALUENGA (until 31/08/2014)
Representative of the Robotics division	JAN ROSELL GRATACOS (since 22/10/2014)
Administrator	CARME MARTÍNEZ VILOR (until 30/09/2014)
Technical and Management Support Area - UTGAEIB	ANA BELÉN CORTINAS ABAD (since 1/10/2014)
Representative of teaching and research staff who hold a PhD	ROBERT GRIÑÓ CUBERO (since 22/10/2014)
Representative of teaching and research staff who do not hold a PhD	GEMA CALLEJA SANZ
Representative of administrative and service staff	MARTA FUENTES ABADIA (fins el 30/09/2014)
Representative of administrative and service staff	LEOPOLD PALOMO AVELLANEDA (since 1/10/2014)

The Council

Arias Pujol, Antoni	
Batlle Arnau, Carles	
Basañez Villaluenga, Luís	Representative of the Robotics division (until 31/08/2014)
Benedito Benet, Ernest	Assistant director
Biel Solé, Domingo	Representative of the Control division
Calleja Sanz, Gema	Representative of teaching and research staff who do not hold a PhDr
Cortinas Abad, Ana Belen	Technical and Management Support Area - UTGAEIB (since 1/10/2014)
Corominas Subias, Albert	
Costa Castelló, Ramon	
Coves Moreno, Anna Maria	
Dòria Cerezo, Arnau	Secretary
Ferrer Llop, Josep	
Ferrer Martí, Laia	
Fossas Colet, Enric	
Fuentes Abadia, Marta	Representative of administrative and service staff (until 30/09/2014)
García Villoria, Alberto	
Griñó Cubero, Robert	
Lusa Garcia, Amaia	
Martínez Costa, M. Carme	
Martínez Vilor, Carme	Head of Management and Support Services (fins el 30/09/2014)
Mas Casals, Orestes	
Mateo Doll, Manel	
Montaño Sarria, Andrés Felipe	
Olivella Nadal, Jordi	
Olm Miras, Josep Maria	
Palomo Avellaneda, Leopold	Representative of administrative and service staff (since 1/10/2014)
Pastor Moreno, Rafael	Representative of the Industrial Engineering and Logistics division
Peña Pitarch, Esteban	
Puerta Coll, Xavier	
Rosell Gratacòs, Jan	Representative of the Robotics division (since 22/10/2014)
Suárez Feijóo, Raúl	Director

3. Staff

NAME		DIVISIONS / SERVICE	CATEGORIES
AKBARI	ALIAKBAR	ROB	BR
ALDANA LÓPEZ	CARLOS IVÁN	ROB	LT
ALVARADO TOVAR	NOÉ	ROB	BR
ARIAS PUJOL	ANTONI	CTL	TU
BASAÑEZ VILLALUENGA	LUIS	ROB	CU
BASAÑEZ VILLALUENGA	LUIS	ROB	Emeritus
BATLLE ARNAU	CARLES	CTL	TU
BELTRÁN GUERRERO	DIANA	ROB	BR
BENEDITO BENET	ERNEST	EOL	AG
BIEL SOLÉ	DOMINGO	CTL	TU
CALLEJA SANZ	GEMA	EOL	AJ
CARDONER PARPAL	RAFEL	SSR	LF
CARRERO CANDELAS	NILIANA A.	CTL	BR
CLARET ROBERT	JOSEP ARNAU	ROB	BR
COROMINAS SUBIAS	ALBERT	EOL	CU
COROMINAS SUBIAS	ALBERT	EOL	Emeritus
COSTA CASTELLÓ	RAMON	CTL	TU
COVES MORENO	ANNA MARIA	EOL	TU
DÒRIA CEREZO	ARNAU	CTL	AG
FERRER LLOP	JOSEP	CTL	CU
FERRER MARTÍ	LAIA	EOL	AG
FOSSAS COLET	ENRIC	CTL	CU
FUENTES ABADIA	MARTA	ADM	FC
GARCÍA VILLORIA	ALBERTO	EOL	PL
GRIÑÓ CUBERO	ROBERT	CTL	TU
HA	BINH MINH	CTL	
LUSA GARCÍA	AMAIA	EOL	TU

NAME		DIVISIONS / SERVICE	CATEGORIES
MARTÍNEZ COSTA	CARME	EOL	TU
MARTÍNEZ VILOR	CARME	ADM	FC
MAS CASALS	ORESTES	ROB	TU
MATEO DOLL	MANUEL	EOL	TU
MIRÓ VALERO	ENRIC	SSR	LF
MIRSHAHI	SHIVA	ROB	BR
MONTAÑO SARRIA	ANDRÉS FELIPE	ROB	BR
MUHAYYUDDIN		ROB	BR
MUÑOZ AGUILAR	RAUL SANTIAGO	CTL	
OLIVELLA NADAL	JORDI	EOL	TU
OLM MIRAS	JOSEP M.	CTL	AG
ORELLANA BARCELÓ	MARCOS	CTL	BR
PALOMO AVELLANEDA	LEOPOLD	SSR	LT
PASTOR MORENO	RAFAEL	EOL	CU
PEÑA PITARCH	ESTEBAN	ROB	TU
PORTILLA RODRIGUEZ	HENRY RAMÓN	ROB	BR
PUERTA COLL	XAVIER	CTL	TU
RANABOLDO	MATTEO	EOL	BR (FPU)
REPECHO DEL CORRAL	VICTOR	CTL	LT
RODRÍGUEZ PACHECO	CARLOS	ROB	BR
ROIG FERNÁNDEZ	VICENÇ	SI	LF
ROSELL GRATACÒS	JAN	ROB	TU
RÚA COSTA	CARLES	EOL	PAL
RUIZ PARRA	SERGI	ROB	LT
RUIZ PARRA	SERGI	ROB	
SUÁREZ FEIJÓO	RAÚL	ROB	DI
ZAPATA PÉREZ	NOEMÍ	ADM	FC
ZAPLANA AGUT	ISIAH	ROB	BR

GLOSSARY

DIVISIONS/SERVICE	**ADM**	Administration
	CTL	Division of Automatic Control
	EOL	Division of Industrial Engineering and Logistics
	ROB	Division of Robotics
	SI	Computer Services
	SSR	Resarch Support Services
CATEGORY	**AG**	Senior Lecturer
	AJ	Assistant professor
	BR	Research grantholder
	CU	Professor
	DI	Research supervisor
	EV	Students linked to the IOC
	LT	Technical staff
	PAL	Assistant lecturer
	PAS	Administration staff
	PL	Assistant lectures
	TU	Lecturer

4. Divisions

Research at the IOC is conducted through three divisions:

Division of Automatic Control

The objective of the Division of Automatic Control is the research and development of techniques of modelling, simulation and process control, including the application to specific industrial projects and the necessary procedures for their implantation.

Head: DOMINGO BIEL SOLÉ

Fields of activity

- Modelling
- Simulation
- Control
- Electronics
- Optimisation of industrial resources
- Automated inspection

Division of Industrial Engineering and Logistics

The thematic scope of the Division of Industrial Engineering and Logistics covers the design and management of the supply chain, namely production and logistic systems to generate goods and services, as well as the necessary techniques for solving efficiently its derived problems.

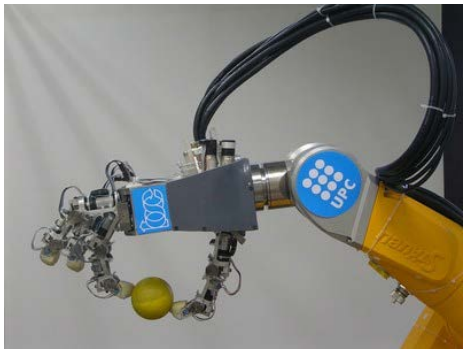
Head: RAFAEL PASTOR MORENO

Fields of activity

- Supply chain design
- Capacity planning
- Aggregate planning

- Design and task assignment of assembly and production lines
- Activity programming
- Working time management
- Task assignment to employees taking into account learning and forgetting effects
- Urban logistics
- Port logistics
- Reverse logistics
- Green logistics
- Simulation of production and logistic systems
- Generator assignment and electrification of isolated areas
- Quantitative techniques
- Lean management

Division of Robotics



The division of Robotics of the IOC comprises basic and applied research on the various aspects of the robot as a machine and on its integration with other elements and units for constituting robotised systems. It also extends to the fields of utilisation of robots in production, exploration and assistance, in both the industrial and service areas.

Head: JAN ROSELL GRATACÒS

- Fields of activity
- Control and programming of robots
- Design of robotised cells
- Perception systems
- Computer vision
- Shape recognition
- Simulation of robotised systems
- Industrial applications of robotics
- Service robots

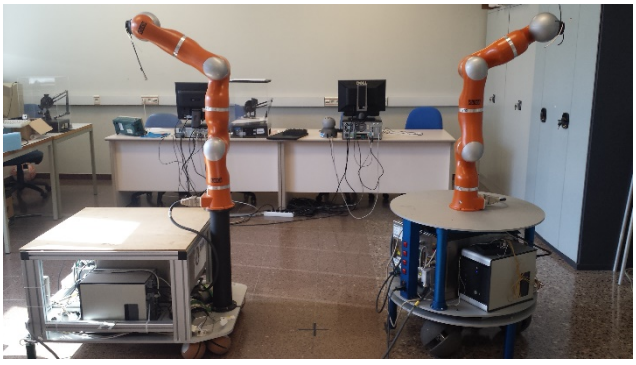
5. Facilities

The IOC is located on the 11th floor of building H of the Barcelona School of Industrial Engineering.

The Institute has a robotics laboratory; a control and electronics laboratory; a remote control laboratory; a logistics laboratory; a computer network equipped with servers, workstations, PCs and software; a WiFi network; a specialised library with around 6,000 books and numerous journals; a classroom that can hold 25 people; and a meeting room with a digital blackboard and a projector with a capacity for 10 people.

Equipping research laboratories

Robotics Laboratory



- 2 robots Stäubli TX90 one is munted on a motorised rail.
- 2 robots Kuka LWR de 7 axes, each mounted on a mobile platform (BMM1 i BMM2).
- Several press systems, tweezers and robotic hands: Schunk SAH, Schunk SDH and two Allegro hand.
- Haptic devices: Phantom Omni, Phantom Premium 1.5/6DOF i Phantom Premium 1.5/6DOF High force.
- Capture systems such as video cameras, trackers, force sensors, tactile sensors and 3D cameras.
- 3D projector with corresponding glasses.
- Humanoid robot comprising two arms Universal.
- Several servers, PCs, monitors.
- 2 virtual reality glasses Oculus Rift
- 1 Drone DJI Phantom 2 Vision+
- 1 Drone Parrot AR.Drone 2.0

Control and Electronic Laboratory

- Oscilloscopes
- Analyzers and signal generators
- Sources and power loads (e.g. sources ac, dc and programmable power load)
- Measuring instrumentation (the multimeter, differential probes, current probes)
- Emulators microprocessors and digital signal processors
- Computers
- The hardware and software for the design and implementation of electronic circuits
- Tools and equipment essential to the realization of small-scale mechanical assemblies

Logistic Laboratory

- 18 computers: 12 which are designed to make computing experiences; the other 6 are reserved for doctoral, masters and designers
- 18 SAIs
- 9 screens
- 3 switches for keyboards/screens
- Specialized software: IBM ILOG CPLEX Optimization Studio 12.6

6. University masters

Master's Degree in Automatic Control and Robotics

The Master in Automatic Control and Robotics is an official university degree adapted to the European Higher Education Area (EHEA) of the Technical University of Catalonia (UPC) which is offered since the academic year 2006-2007. The master is taught coordinately between the Automatic Control Department (ESAII) and the Institute of Industrial and Control Engineering (IOC).

Shape graduate with a high degree of excellence in the analysis, management and optimization of process control and robotics, engineering, industrial and residential environments, and social services. These activities are key to social progress, economic productivity and quality of life.

This master has been selected within the program of scholarships for Masters of excellence Fundació Catalunya - La Pedrera for the academic year 2015-2016.

Master's degree in Supply Chains, Transport and Mobility

The master's degree in Supply Chains, Transport and Mobility productes technical professionals with a high level of excellence in the analysis, management and optimisation of logistics and transport systems in the fields of civil and industrial engineering. These are basic activities in the organisation of society, the productivity of the economy in a region and the quality of life of the population.

Career opportunities for graduates of this program are related to both the public and private sectors in the fields of logistics, transport and mobility. This master's degree work at a design and management of supply chain and logistics company (responsible for logistics, consulting, etc.), or to delve into directing research towards a PhD, or be able to exercise design features and management of infrastructure and transportation networks (consulting, planning transport companies or government, for example). especially public transport networks.

7. Doctoral degrees

The Institute of Industrial and Control Engineering (IOC) was set up for the purposes of conducting research and training researchers to a high level of specialisation. It is actively involved in teaching master's and doctoral degrees.

Doctoral programme in Automatic Control, Robotics and Computer Vision (ARV)

The Doctoral programme in Automatic Control, Robotics and Computer Vision (ARV) emerges in 2006 from the fusion of the Doctoral programme in Advanced Automation and Robotics of the Institute of Industrial and Control Engineering (IOC) and of the Doctoral programme in Control, Vision and Robotics of the Automatic Control Department (ESAII), both with Quality Mention of the Spanish Ministry of Education (MEC). The fusion is fruit of an increasing thematic affinity and convergence between both programmes, and is carried out taking advantage of the opportunity to adapt the programme to the new syllabus of the Official Postgraduate Programmes in the framework of the European Higher Education Area.

The ARV Doctoral programme has also achieved the Excellence Mention by the Spanish Ministery of Education, with code MEE2011-0453. This mention, which is valid from academic year 2011-2012 until 2013-2014, substitutes previous Quality Mention, which the programme had from academic year 2007-2008 until 2010-2011.

Units involved in the program are:

- Automatic Control Department (ESAII)
- Institute of Industrial and Control Engineering (IOC)

Doctoral Committee for the doctoral degree in Advanced Automation and Robotics (AAR)

- Angulo Bahon, Cecilio
- Basañez Villaluenga, Luis (emeritus) *until 31/08/2014*
- Corominas Subias, Albert (emeritus) *until 31/08/2014*
- Griñó Cubero, Robert
- Martínez Velasco, Antonio Benito
- Pastor Moreno, Rafael *since 1/09/2014*
- Puig Cayuela, Vicenç
- Rosell Gratacòs, Jan *since 1/09/2014*
- Sanfeliu Cortés, Alberto
- Suárez Feijóo, Raúl (Coordinator PhD ARV)

Dades doctorat 2014

A. Coordination program	**RAÚL SUÁREZ FEIJÓO**
B. Number of students	**85** (matriculation 2013/2014)

Thesis Proposal

21/05/2014	***Contribución al análisis del movimiento humano aplicado a la identificación de posturas y bloqueos de la marcha en pacientes con Parkinson***
Author	RODRÍGUEZ MARTÍN, DANIEL MANUEL
Supervisor	CATALÀ MALLOFRE, ANDREU
Qualification	Excel·lent Cum Laude

20/06/2014	***Methodologies for Hybrid Systems Diagnosis based on the Hybrid Automaton Framework***
Author	VENTO MALDONADO, JORGE ISAAC
Supervisor	PUIG CAYUELA, VICENÇ
Cosupervisor	SARRATE ESTRUCH, RAMON
Qualification	Excel·lent

18/07/2014	***Modelado, simulación y control de un convertidor boost acoplado magnéticamente***
Author	CARRERO CANDELAS, NILIANA ANDREINA
Supervisor	FOSSAS COLET, ENRIC
Qualification	Excel·lent Cum Laude

04/11/2014	***Hybrid modelling and receding horizon control of combined sewer networks***
Author	JOSEPH DURAN, BERNAT
Supervisor	CEMBRANO GENNARI, M.GABRIELA ELENA
Cosupervisor	OCAMPO MARTINEZ, CARLOS AUGUSTO
Qualification	Excel·lent

07/11/2014	***Experimental and Model-based Analysis for Performance and Durability Improvement of PEM Fuel Cells***
Author	STRAHL, STEPHAN
Supervisor	RIERA COLOMER, JORDI
Cosupervisor	HUSAR, ATTILA PETER
Qualification	Excel·lent Cum Laude

27/11/2014	***Diagnosis and Fault-tolerant Control using Set-based Methods***
Author	XU, FENG
Supervisor	PUIG CAYUELA, VICENÇ
Cosupervisor	OCAMPO MARTINEZ, CARLOS AUGUSTO
Qualification	Excel·lent Cum Laude

8. Projects and agreements

Public funding projects

Head researcher:	Robert Griñó
Title:	Técnicas de control avanzado para la mejora de la operación de convertidores VSI conectados a la red eléctrica (COCORED)
Funding institution:	Ministerio de Ciencia e Innovación
Reference:	DPI2010-15110
Amount:	121.000,00€
Start-up date:	01/01/2011
Completion date:	31/03/2014

Description:

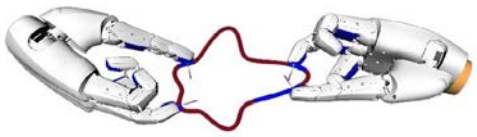
The project foresees to contribute in the control systems theory area and, also, in a particular power electronics application with a clear practical interest. So, in this sense, the aim of the project is twofold. On the one hand, to obtain theoretical results in the field of the control techniques that will be worked. These results are envisaged in two main areas: first, to obtain robust control algorithms in front of model uncertainty and, also, in front of the fundamental frequency variations of the signals to be tracked or attenuated; and, second, to state design methodologies clearer enough to allow its industrial use. On the other hand, to apply these control techniques, with the obtained theoretical enhancements, to the particular problem of AC-DC and DC-AC conversion with a non-ideal grid. It is important to remark that the grid anomalous situations can be captured in the uncertainty types that will be theoretically worked in the project.

In any case, the experimental plant will be a power bidirectional three-phase power electronics converter with a voltage DC bus (VSI) in its two operational modes: active rectifier and inverter connected to the grid. Also, a special emphasis will be done in the validation of its operation with various grid situations: fundamental frequency variations, non-sinusoidal voltages (with higher-order harmonics), asymmetrical three-phase systems and unknown and time-variant network impedances (strong and weak grids). It is important to note that the dynamics of these plants is very fast, their measurement noise levels are high, the sensors have a limited bandwidth by cost reasons and the sampling period is bounded from below by the required computation time of the control algorithm and by the necessity to reduce the switching losses of the converter to obtain an adequate power efficiency.

Another objective of the project is to ensure that the designed controllers will be interesting, by their complexity and their hardware implementation cost, for the industrial sector.

Head researcher:	Raúl Suárez
Title:	Sistemas multi-mano para tareas complejas de manipulación robotitzada (MUMA)
Funding institution:	Ministerio de Ciencia e Innovación
Reference:	DPI2010-15446
Amount:	231.110,00€
Start-up date:	01/01/2011
Completion date:	31/03/2014

Description:



The majority of robotized tasks, as well as those of potential robotization, whether in industrial or service robotics, require adequate grasping and manipulation of objects. This fact, together with advances in the design, construction and control of electromechanical systems, has led to the development of sophisticated and versatile grasping elements, including the proposal of anthropomorphic mechanical hands, some of which are already commercially available. The complexity of the tasks to be carried out by such devices has given rise to a line of research oriented to solving automatically the problems of grasping and manipulation. The objective is essentially to hold and manipulate an object in an optimal fashion for a given purpose; as a function of the case, this may involve a number of associated problems, such as determining adequate contact points on the object, appropriate hand configurations, correct grasping forces, and collision-free trajectories for hand and robot, among other related problems, always characterised by a high computational complexity. Considerable progress has been achieved along this line of research, including contributions of the proposing group in the course of previous research projects. But there is still a long way to go and the current challenge is to advance a qualitative step in the robotized grasping and manipulation of objects by developing the algorithms needed to automate multi-hand systems, i.e. when more than one grasping element is available. The object of the present project is to achieve this qualitative jump, by proposing new techniques and developing new algorithms that allow multi-hand systems to perform those tasks, both for cases that require more than one grasping element and for those that, though not absolutely required, the use of more than one grasping element allows better solutions based on different optimisation criteria (for instance, more robustness or adaptability to the task). In the framework of the project a two-hand system will be implemented and used to validate experimentally the theoretical developments. The results of the project could be applied both in industrial environments and in service robotics; moreover, they are foreseeing to be essential for the efficient use of humanoid robots, which obviously need to be capable of resolving tasks with their two hands in a similar fashion to human beings.

Head researcher:	Amaia Lusa
Title:	Planificación de la capacidad a largo plazo y diseño de la red de suministro (PLACYRES)
Funding institution:	Ministerio de Ciencia e Innovación
Reference:	DPI2010-15614
Amount:	50.820,00€
Start-up date:	01/01/2011
Completion date:	31/03/2014

Description:

The overall objective of this project is to develop models for strategic planning and determine the appropriate resolution procedures. Within this level of planning they are intended to follow two lines of research: (1) planning the long-term capacity (PC); and (2) the design of the grid (SRD).

The capacity planning (PC) should include, on the one hand, the needs of enlargement or reduction of long-term capacity and, second, the possibility of renewing some of the equipment. Consequently, the capacity plan will include the purchase or sale of equipment (and hiring or layoffs) in certain periods of time and also the periods when equipment must be renewed. The resulting plan must be economically viable so that investments should be treated in an appropriate manner, taking into account the characteristics of the available funding sources and the possibilities for the placement of surplus funds.

The design of the grid, as the PC, you should also consider the funding requirements and the consequences for the functioning of the system. Designing the RS means deciding which existing units and creating new units to be elements of the chain and the relationships to be established between them.

For PC is considered formed by one or a few production units systems, being the temporal dimension (long term planning) it will bring more difficulties to its resolution; The DRS, which will consider the possibility of very complex systems (suppliers, manufacturing units, distribution, etc. that may be located anywhere in the world), shall be for a particular instant of time (static design). As a further object, the ability to integrate both lines of investigation will be studied. That is, address the DRS including the temporal dimension (dynamic design).

In short, it is to have models and resolution tools for strategic capacity planning and design of the grid to suit the current needs of companies and taking advantage of scientific and technological possibilities that are available today in day.

Head researcher:	Laia Ferrer
Title:	Electrificación rural con energia eólica y solar (EREES)
Funding institution:	Ministerio de Ciencia e Innovación
Reference:	ENE2010-15509
Amount:	48.400,00€
Start-up date:	01/01/2011
Completion date:	31/03/2014

Description:

The overall objective of this research project is to optimize the design and efficiency of autonomous rural electrification systems with renewable energy through the development of models and tools to support multi decision. Specifically, this project rural electrification systems based on the use of wind and solar energy by combining the use of individual generators and micro, for both developed countries and developing are studied. In this sense, it is appropriate to the conditions and characteristics of companies and other institutions promoting and future users, ensuring that the solutions obtained will be successful and sustainable over time.

Head researcher:	Luis Basañez
Title:	Sincronización y teleoperación con interacción visual 3D de redes de manipuladores móviles y robots con articulaciones flexibles (SYNTENET)
Funding institution:	Ministerio de Ciencia e Innovación
Reference:	DPI2011-22471
Amount:	275.880,00€
Start-up date:	01/01/2012
Completion date:	31/12/2014

Description:

Among the current issues of development of robotics prominently telerobotics, rise to numerous research centers worldwide are dedicating a continuous effort. The reason for this interest is manifold. Telerobotics is much more than the remote control of a robot and today is considered as the extension of the sensory faculties and human action. In this sense their uses are extensive, ranging from medicine and surgery to space exploration through mine clearance and explosive and construction of buildings and infrastructure. The communication possibilities offered by the Internet have also contributed decisively to this development.

Many achievements in telerobotics but crucial issues remain to be resolved. On the one hand, the approach of new control algorithms that rigorous, ensure the stability of the systems in most demanding operating conditions and variable lags, joint flexibility, and joint manipulation mobile manipulator robot-robot and human-robot . On the other hand it is necessary to increase aid to the operator, allowing for example, interact with the scene through real three-

dimensional images, thus enabling the effective use of tools such as relational positioning. A natural continuation of telerobotics is teleoperation robot presenting network synchronization problems and consensus. These problems are attracting the attention of the scientific community for its possible extension to other fields than robotics such as nonlinear systems described by Euler-Lagrange spanning many physical systems of practical interest and that Robots are a special case. The project objective is to address the aforementioned issues through rigorous theoretical development, simulation and actual experimentation to validate the results. The expected contribution of the project are both theoretical and application in industrial robotics tasks and service, using both fixed and mobile manipulators as humanoid robots.

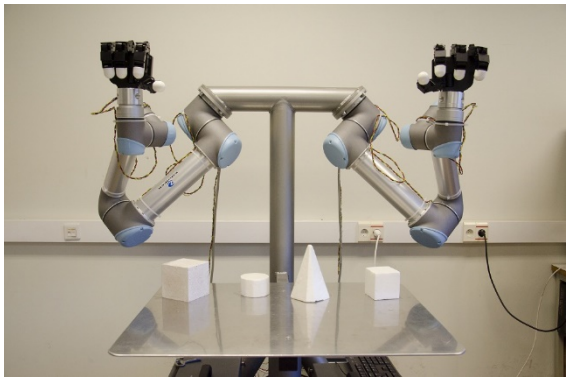
Head researcher:	Ernest Benedito
Title:	Development of the Lyon-Madrid axis on the TEN-T Mediterranean Corridor (CLYMA)
Funding institution:	Unió Europea
Reference:	TENT-T-94174-S-CLYMA
Amount:	352.566,00€
Start-up date:	15/03/2013
Completion date:	31/12/2015

Description:

Within the context of the TEN-T Mediterranean Corridor Global Project, this Action focuses on freight transport connecting Lyon and Madrid (CLYMA) to enable a coordinated implementation of the network. It comprises of studies on the organization and optimal implementation of the TEN-T network, taking into account long-term perspectives, environmental aspects and associated needs, as well as studies that promote environmental sustainability, resource efficiency and low–carbon transport within an integrated transport concept. This should stimulate the deployment of the Green Corridor concept as introduced in the Freight Logistic Action Plan. The project also intends to develop a managerial structure for the intermodal corridor.

Head researcher:	Raúl Suárez
Title:	Prensión y manipulación diestra, móvil y cooperativa (DEMCO)
Funding institution:	Ministerio de Economía y Competitividad.
Reference:	DPI2013-40882-P
Amount:	102.850,00€
Start-up date:	01/01/2014
Completion date:	31/12/2016

Description:



In recent years there have been significant advances in the area of object grasping and manipulating using robots, both from the point of view of developing new mechanical hands with anthropomorphic structure as in terms of algorithms to search for an efficient use of these hands. However, the actual implementation of these hands in tasks that require some skill is still quite limited and it is still common the use of grippers specially designed for a certain application, and even the use of very simple grippers with only two opposite fingers when looking for usefulness and robustness. One of the main causes of this limitation is the difficulty in determining the appropriate movements to perform a task in the presence of several uncertainty sources, a problem that can be tackled by making greater use of tactile information in all the phases of the grasping and manipulation tasks. On the other hand, mobile robotics has also advanced significantly, to the point of defining its own work field with many different applications, but when the mobile device is provided with a device for grasping and dexterous manipulation they generally work in uncoupled way, the mobile device is positioned according to certain criteria and then the grasping device acts as an static one. In this context, the overall objective of the project is to advance towards the elimination of these deficiencies. The robotics group of the IOC has extensive experience in the area of grasping and manipulation objects with robotic hands, planning and optimizing the movements of both the hand and the arm that supports it, and now it is intended to extend that experience in two directions. Basically, on one hand, deepening in the problems concerning the use of dexterous hands with many degrees of freedom when there exist different sources of uncertainty, for which there will be special emphasis on the use of tactile information, and, on the other hand, addressing the problem of determining efficient actions when the whole dexterous manipulation device is mounted on a mobile element. As a complementary topic it is also considered the cooperative action of more than one manipulator. Thus, the project aims to make contributions in the three typical levels of these systems: hand level, arm level and body level. As in previous projects of the group, the above problems are addressed with the intention to provide general solutions that are valid both in industrial and service robotics.

Head researcher:	Josep Mª Olm
Title:	Control avançat de sistemes d'energia
Funding institution:	Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference:	2014 SGR 267
Amount:	30.000,00€
Start-up date:	01/01/2014
Completion date:	31/12/2016

Description:

The generic goal of SGR financial supports is to recognise and promote high quality research, technology transfer, and internationalization of the scientific activities of catalan research groups. As regards ACES group, the support is assigne dto complement pre and/or post-doc research contracts, grants for Master Theses Projects, visiting professors and mobilities of the members of the group.

Head researcher:	Luís Basañez
Title:	SIR: Service and industrial robotics
Funding institution:	Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference:	2014 SGR 1433
Amount:	18.000,00€
Start-up date:	01/01/2014
Completion date:	31/12/2016

Description:

The group SIR performs the research activity in industrial and service robotics following traditional approaches as well as new paradigms where the robots are allowed to work safely alongside humans in such a way that they become collaborative coworkers and fellows in the factory floor and at home. In this scope, the research work of the group is mainly focused on transversal tools for dexterous, mobile and cooperative manipulation as well as for robot teleoperation. The list of addressed topics includes control and communications through the Internet, relational positioning, vision systems and 3D augmented reality, automatic synthesis of grasps, telemanipulation, programming by demonstration, human-like motion planning, simultaneous task and motion planning, and physics-based manipulation planning. Typical tools used in this research are haptic devices, mobile platforms, industrial robots, dual-arm robots, mechanical hands and sensory systems.

Agreements with companies

Head researcher:	Raúl Suárez
Title:	Estudi del desenvolupament de dos contractes de compra maquinària robotitzada
Funding institution:	Solutions Studies Science and Support for Engineering S.L
Reference:	6.075,00€
Amount:	24/10/2014
Start-up date:	24/05/2015

Description:

The object of the agreement is the completion of a report on the evolution of two contracts for the acquisition of industrial machinery. This project will lead to the development of a set of reports, documents and opinions that will be used by the company to evaluate the levels of execution of a contract for the purchase of industrial machinery. The processes that need significant support from the Polytechnic University of Catalonia are: analysis of the documents relating to the two contracts, defining paths assessing the performance of contracts, evaluation, technical support team the company in making decisions regarding the evaluation of contracts, processes, communication of results, issuing opinions and corresponding attendance at meetings and hearings arising of such opinions.

9. Publications

Articles in Journals

Division of Automatic Control

Batlle Arnau, Carles; Gomis, Joaquim; Kamimura, kiyoshi; Zanelli, Jorge Journal: Physical review D - Particles, fields, gravitation and cosmology Vol. 90, Issue. 6 *Dynamical sectors for a spinning particle in AdS(3* DOI: 10.1103/PhysRevD.90.065017 Date: 2014-09-12

Batlle Arnau, Carles; Gomis, Jaoquim; Kamimura, kiyoshi Journal: Symmetry, integrability and geometry: methods and Applications Vol. 10 T *Symmetries of the Free Schrodinger Equation in the Non-Commutative Plane* DOI: 10.3842/SIGMA.2014.011 Date: 2014-01-01

Compta, A.; Ferrer, J.; Peña, M. Journal: Mathematical methods in the applied sciences, vol. 37, Issue. 1, pages. 20-31 Agency Impact: JCR-Science Edition (2013) Impact index: 0.877 ISSN: 0170-4214 Year: 2014 Quartile: Q2 Title: Miniversal deformations of observable marked matrices URL text: http://onlinelibrary.wiley.com/doi/10.1002/mma.2780/abstract;jsessionid=3734BF2BBF605A767EB3E23C2999C5CD.f03t03

Ferrer, J.; Peña, M.; Susin, A. Journal: Mathematical problems in engineering, vol. 2014, pages. 1-8 Agency Impact: JCR-Science Edition (2013) Impact index: 1.082 ISSN: 1024-123X Quartile: Q2 Title: Structural stability of planar bimodal linear Systems URL text: http://www.hindawi.com/journals/mpe/2014/892948/

Ferrer, J.; Magret, M. D.; Peña, M. Journal: Mathematical problems in engineering, vol. 2014, núm. Article ID 292813, pages. 1-9 Agency Impact: JCR-Science Edition (2013) Impact index: 1.082 Number of citations: 2 ISSN: 1024-123X Quartile: Q2 Title: Differentiable families of planar bimodal linear control Systems URL text: http://www.hindawi.com/journals/mpe/2014/292813/

Ha, M.; Batlle, C.; Fossas, E. Journal: Automatica, vol. 50, núm. 8, pages. 2196-2198 JCR-Science Edition (2013) Impact index: 3.132 Number of citations: 1 ISSN: 0005-1098 Quartile: Q1 Title: A new estimation of the lower error bound in balanced truncation method URL text: http://www-ma4.upc.edu/~carles/fitxers/lower_bound_automatica_v2.pdf

Ma, K.; Muñoz-Aguilar, R. S.; Rodriguez, P.; Blaabjerg, F. Journal: IEEE transactions on industry applications, vol. 50, núm. 1, pages. 415-423 JCR-Science Edition (2013) Impact index: 2.046 Number of citations: 1 ISSN: 0093-9994 Quartile: Q1 Title: Thermal and efficiency analysis of five-level multi-level clamped multilevel converter considering grid codes URL text: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6523947

Medjmadj, S.; Diallo, D.; Mostefai, M.; Delpha, C.; Arias, A. IEEE transactions on energy conversion, vol. 30, Issue. 1, pages. 349-358 JCR-Science Edition (2013) Impact index: 3.353 ISSN: 0885-8969 Year: 2015 Quartile: Q1 Title: PMSM drive position estimation: contribution to the high-frequency injection voltage selection issue URL text: http://hdl.handle.net/2117/27831

Muñoz-Aguilar, R. S.; Rodriguez, P.; Doria-Cerezo, A.; Candela, J.; Luna, A.Journal (Title, volum, pàgina inicial-final): International journal of electrical power and energy systems, vol. 60, pages. 275-282 JCR-Science Edition (2012)Impact index: 3.432 ISSN: 0142-0615 Quartile: Q1 Title: A sensor-less sliding mode control scheme for a stand-alone wound rotor synchronous generator under unbalanced load conditions

Na, J.; Ren, X.; Costa-Castelló, R.; Guo, Y. Journal (Title, volum, pàgina inicial-final): Robotics and autonomous systems, vol. 62, Issue. 3, pages. 319-329 JCR-Science Edition (2013) Impact index: 1.105 ISSN: 0921-8890 Quartile: Q3 Title: Repetitive control of servo systems with time delays URL text: http://hdl.handle.net/2117/22443

Espina, J.; Ortega, C.; De Lilo, L.; Empringham, L.; Balcells, J.; Arias, A. Title: Reduction of Output Common Mode Voltage Using a Novel SVM Implementation in Matrix Converters for Improved Motor Lifetime Journal: IEEE transactions on industrial electronics, vol. 99, Issue. 11, pages. 5903-JCR-Science Edition (2013) Impact index: 6.5 Number of citations: 6 ISSN: 0278-0046 Quartile: Q1 5911URL text: http://hdl.handle.net/2117/22722

Olm, Josep M.; Biel, D.; Fossas, E.; Cardoner, R.. Fixed frequency sliding mode-based robust inversion with a fullbridge current DC-link buck-boost. Journal of the Franklin Institute. Year: 2014. Volum: 351. Issueero: 1. Pages: 123 ~ 138. Projecte o conveni finançador: Arquitecturas Electronicas De Potencia Para Generación Distribuida. Arquitectura Ac; Técnicas de control avanzado para la mejora de la operación de convertidores vsi conectados a la red eléctrica. Agency Impact: JCR-Science Edition. Impact index: 2.26. URL text: http://hdl.handle.net/2117/21626 . DOI:10.1016/j.jfranklin.2013.08.009.

Rain, X.; Hilairet, M.; Arias, A. Energy conversion and management, vol. 86, pages. 701-708 JCR-Science Edition (2013)Impact index: 3.59 ISSN: 0196-8904 Quartile: Q1 Title: Switched reluctance machines control with a minimized sampling frequency URL text: http://www.sciencedirect.com/science/article/pii/S0196890414004671

Sanchez, S.; Ortega, R.; Griño, R.; Bergna, G.; Molinas, M. Journal: IEEE transactions on circuits and systems I: regular papers, vol. 61, Issue. 7, pages. 2204-2211 JCR-Science Edition (2013) Impact index: 2.303 ISSN: 1549-8328 Quartile: Q1 Title: Conditions for existence of equilibria of systems with constant power loads URL text: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6734728

Sarmiento Carnevali, Maria Laura; Serra Prat, Maria; Batlle Arnau, Carles Journal: International journal of hydrogen energy Vol. 39, Issue. 8, p. 4044-4052 Title: Distributed parameter model simulation tool for PEM fuel cells DOI: 10.1016/j.ijhydene.2013.04.015 Date: 2014-03-06.

Division of Industrial Engineering and Logistics

Calleja, G.; Corominas, A.; García-Villoria, A.; Pastor, R. Journal Dyna, vol. 89, Issue. 5, pages. 552-559 JCR-Science Edition (2013) Impact index: 0.2 ISSN: 0012-7361 Quartile: Q4 Title: Equilibrado de líneas de montaje con ventanas de visibilidad. Descripción del problema y procedimiento heurístico de resolución URL text: http://www.Journaldyna.com/busqueda/equilibrado-de-lineas-de-montaje-con-ventanas-de-visibilidad-descripcion-delproblema-y-procedimient

Calleja, G.; Corominas, A.; García-Villoria, A.; Pastor, R. Computers & operations research, vol. 48, pages. 113-123 JCR-Science Edition (2013) Impact index: 1.718 Number of citations: 1 ISSN: 0305-0548 Grups de Recerca vinculats: EOLI - Enginyeria d'Organització i Logística Industrial Quartile: Q1 Title: Combining matheuristics and MILP to solve the accessibility windows assembly line balancing problem level 2 (AWALBP-L2) URL text: http://www.sciencedirect.com/science/article/pii/S0305054814000641

Corominas, A.; García-Villoria, A.; Pastor, R.Journal: SORT: statistics and operations research transactions, vol. 38, Issue. 1, pages. 3-12 Agency Impact: Sello de Calidad FECYT (2014) ISSN: 1696-2281 Title: Improving parametric Clarke and Wright algorithms by means of EAGH-1 URL text: http://hdl.handle.net/2117/26617

Domenech, B.; Ferrer-Martí, L.; Lillo, P.; Pastor, R.; Chiroque, J.Journal: Energy for sustainable development: the journal of the international energy initiative, vol.23, pages. 275-285 JCR-Science Edition (2013) Impact index: 2.36 Number of citations: 1 ISSN: 0973-0826 Quartile: Q2 Title: A community electrification project: combination of microgrids and household systems fed by wind, PV or micro-hydro energies according to micro-scale resource evaluation and social constraints URL text: http://hdl.handle.net/2117/26520

Juan-Pérez, A.; Lourenço, H.; Mateo, M.; Luo, R.; Castella, Q. Journal: International transactions in operational research, vol. 21, Issue. 1, pages. 103-126 Agency Impact: JCR-Science Edition (2013) Impact index: 0.481 Number of citations: 3 ISSN: 0969-6016 Quartile: Q4 Title: Using iterated local search for solving the flow-shop problem: Parallelization, parametrization, and randomization issues URL text: http://onlinelibrary.wiley.com/doi/10.1111/itor.12028/pdf

Martinez, M.; Mas, M.; Benedito, E.; Corominas, A. Journal: International journal of production economics, vol. 153, pages. 66-85 Agency Impact: JCR-Science Edition (2012) Impact index: 2.081 ISSN: 0925-5273 Quartile: Q1 Title: A review of mathematical programming models for strategic capacity planning in manufacturing URL text: http://www.sciencedirect.com/science/article/pii/S0925527314000917

Mas, M.; Sainz, M.; Martinez, M. Journal: Intangible capital, vol. 10, Issue. 1, pages. 1-25 Agency Impact: SCOPUS-SJR-SCImago Journal Rank (2012) Impact index: 0.283 ISSN: 1697-9818 Quartile: Q3 Title: A Review of forecasting models for new products URL text: http://www.intangiblecapital.org/index.php/ic/article/view/482

Mateo, M.; Teghem, J.; Camps, J. Pàgines: 177-177 Edició de congrés: 20th Conference of the International Federation of Operational Research Societies Tipus de document: Abstract-Conference Paper Publicació: 20th Conference of the International Federation of Operational Research Societies. 2014. Tipus d'edició de congrés: Congrés Localitat: Barcelona País: Espanya Title: Algorithm for bicriteria scheduling in parallel machines with eligibility

Ranaboldo, M.; García-Villoria, A.; Ferrer-Martí, L.; Pastor, R. Journal: Energy, vol. 73, pages. 96-109 JCR-Science Edition (2013) Impact index: 4.159 ISSN: 0360-5442 Quartile: Q1 Title: A heuristic method to design autonomous village electrification projects with renewable energies URL text: http://hdl.handle.net/2117/24560

Ranaboldo, M.; Ferrer-Martí, L.; Velo, E. Journal: International journal of green energy, vol. 11, Issue. 1, pages. 75-90 Agency Impact: JCR-Science Edition (2013) Impact index: 1.469 Number of citations: 4 ISSN: 1543-5075 Quartile: Q2 Title: Micro-scale wind resource assessment for off-grid electrification projects in rural communities. A case study in Peru URL text: http://www.tandfonline.com/doi/abs/10.1080/15435075.2013.769878#.UkQEVH-0Y0I

Ranaboldo, M.; Domenech, B.; Vilar, D.; Ferrer-Martí, L.; Pastor, R.; García-Villoria, A. Journal: Applied energy, vol. 118, pages. 280-291 Agency Impact: JCR-Science Edition (2013) Impact index: 5.261 ISSN: 0306-2619 Quartile: Q1 Title: Renewable energy projects to electrify rural communities in Cape Verde. URL text: http://hdl.handle.net/2117/21375

Vansteenwegen, P.; Mateo, M. Journal: European journal of operational research, vol. 237, Issue. 3, pages. 802-813 JCR-Science Edition (2013) Impact index: 1.843 ISSN: 0377-2217 Quartile: Q1 Title: An iterated local search algorithm for the single-vehicle cyclic inventory routing problema URL text: http://www.sciencedirect.com/science/article/pii/S0377221714001350

Division of Robotics

Aldana, C.; Nuño, E.; Basañez, L.; Romero, E.. Operational space consensus of multiple heterogeneous robots without velocity measurements. Journal of the Franklin Institute. Any: 2014. Volum: 351. Issue: 3. Pages: 1517 ~ 1539. Projecte o conveni finançador: Sistemas Multi-mano para tareas complejas de manipulación robotizada; Sistema multi-mano para tareas complejas de manipulación robotizada; Sincronización y teleoperación con interacción visual 3D de redes de manipuladores móviles y robots con articulaciones flexibles. Agency Impact: JCR-Science Edition. Impact index: 2.26. URL text: http://hdl.handle.net/2117/22584. DOI:10.1016/j.jfranklin.2013.11.012.

Nuño, E.; Basañez, L.; Lopez-Franco, C.; Arana-Daniel, N. Title: Stability of nonlinear teleoperators using PD controllers without velocity measurements Journal of the Franklin Institute, vol. 351, Issue. 1, pages. 241-258 ISSN: 0016-0032 JCR-Science Edition (2013) Quartile: Q1 Impact index: 2.26 Number of citations: 2 URL text: http://hdl.handle.net/2117/22305

Nuño, E.; Sarras, I.; Basañez, L.; Kinnaert, M. Control of teleoperators with joint flexibility, uncertain parameters and time-delays Robotics and autonomous systems, vol. 62, núm. 12, pages. 1691-1701 ISSN: 0921-8890 Agency Impact: JCR-Science Edition (2013) Quartile: Q3 Impact index: 1.105 URL text: http://hdl.handle.net/2117/24836

Nuño, E.; Valle, D.; Sarras, I.; Basañez, L. Leader-follower and leaderless consensus in networks of flexible-joint manipulators European journal of control, vol. 20, Issue. 5, pages. 249-258 ISSN: 0947-3580 Agency Impact: JCR-Science Edition (2013) Quartile: Q3 Impact index: 0.792 Number of citations: 1 URL text: http://hdl.handle.net/2117/24462

Rodriguez, C.; Montaño, A.; Suarez, R.. Planning manipulation movements of a dual-arm system considerin obstacle removing. Robotics and autonomous systems. Any: 2014. Volum: 62. Número: 12. Pages: 1816 ~ 1826. Projecte o conveni finançador: Sistemas Multi-mano para tareas complejas de manipulación robotizada; Sistema multi-mano para tareas complejas de manipulación robotizada; Sincronización y teleoperación con interacción visual 3D de redes de manipuladores móviles y robots con articulaciones flexibles; Prensión y manipulación diestra, móvil y cooperativa. JCR-Science Edition. Impact index: 1.105. URL text: http://hdl.handle.net/2117/25096 DOI:10.1016/j.robot.2014.07.003.

Sarras, I.; Nuño, E.; Basañez, L. An adaptive controller for nonlinear teleoperators with variable time-delays Journal of the Franklin Institute, vol. 351, Issue. 10, pages. 4817-4837 ISSN: 0016-0032 JCR-Science Edition (2013) Quartile: Q1 Impact index: 2.26 URL text: http://hdl.handle.net/2117/24712

Text in Proceedings of Congress

Division of Automatic Control

Aguilar, W. G.; Costa-Castelló, R.; Angulo, C.; Molina, L. Pages: 140-144 Congressional Edition: IX Congreso de Ciencia y Tecnología Type: Article-Conference Paper ISBN: 1390-4663 Published: Journal Digital Congreso de Ciencia y Tecnología : Memorias. Sesiones Técnicas. 2014. Congressional Edition: Congrés Localitat: Sangolquí País: Equador Title: Control autónomo de cuadricópteros para seguimiento de trayectorias URL de la published: http://ciencia.espe.edu.ec/wp-content/uploads/2014/04/MEMORIA-CONGRESO-CT-2014.pdf

Alva, M.; Camas, A.; García, N.; Costa-Castelló, R. Pages: 968-973 Congressional Edition: XXXV Jornadas de Automática Type: Article-Conference Paper ISBN: 978-84-697-0589-6 Published: Actas de las XXXV Jornadas de Automática: 3-5 de septiembre de 2014, Valencia. Comité Español de Automática (CEAIFAC) 2014.Congressional Edition: Jornada Localitat: València

País: Espanya Title: Operación óptima de la planta de los 4 tanques URL de la published: http://www.ja2014.upv.es/listado-de-contribuciones-las-jornadas/

Biel, D.; Doria-Cerezo, A.; Repecho, V.; Fossas, E.. Sliding mode control of a three-phase three-wire LCL rectifier.IEEE 23rd International Symposium on Industrial Electronics (ISIE 2014): 1-4 June 2014: Grand Cevahir Hotel and Convention Center, Istanbul, Turkey: proceedings. published: Istanbul, Turquia. Editorial: Institute of Electrical and Electronics Engineers (IEEE). Year: 2014. Pages: 661 ~ 666. ISBN/ISSN: 978-1-4799-2400-4. URL text: www.isie.bound.edu.tr.

Biel, D.; Doria-Cerezo, A.; Fossas, E. Pages: 1-5 Congressional Edition: 13th International Workshop on Variable Structure Systems Type: Article-Conference Paper ISBN: 978-1-4799-5566-4 Published: Variable Structure Systems (VSS), 2014 13th International Workshop on. Institute of Electrical and Electronics Engineers (IEEE). 2014. Congressional Edition: Workshop Localitat: Nantes País: França Title: Sliding mode control of a three-phase four-wire LCL rectifier URL de la
published: http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=6872770

Cóbreces, S.; Griño, R. Pages: 585-591 Congressional Edition: 11th International Conference on Modeling and Simulation of Electric Machines, Converters and Systems Type: Article-Conference Paper ISBN: 978-84-616-9961-2 Published: Proceedings of the 11th International Conference on Modeling and Simulation of Electric Machines, Converters and Systems (ELECTRIMACS 2014). Universitat Politècnica de València. 2014 Congressional Edition: Congrés place: Valencia País: Espanya Title: Hysteretic control of grid-side current for a single-phase LCL grid-connected VSC URL de la published: http://www.electrimacs2014.upv.es

Costa-Castelló, R.; Puig, V.; Blesa, J.Pages 9026-9031Congressional Edition: 19th World Congress of the International Federation of Automatic ControlType: Article-Conference Paper Published: Preprints of the 19th World Congress of The International Federation of Automatic Control, Cape Town, South Africa.August 24-29, 2014. 2014.Dipòsit legal: Congressional Edition: Congrés place: Cape Town Country: Sud-àfrica Title: Teaching model-based fault detection and isolation using project-based learning on a three-tank system

Cruz, D.; Normey-Rico, J.; Costa-Castelló, R. Pages: 11494-11499 Congressional Edition: 19th World Congress of the International Federation of Automatic Control Type: Article-Conference Paper ISBN: 978-3-902823-62-5 Published: Proceedings of the 19th IFAC World Congress, 2014. International Federation of Automatic Control (IFAC). 2014. Congressional Edition: Congrés place: Cape Town Country:

Sud-àfrica Title: Repetitive model based predictive controller to reject periodic disturbances URL: http://www.ifac-papersonline.net/Detailed/67793.htm

Cuadrado Santolaria, Raúl; Perez Batlle, Marcos; Valero Garcia, Miguel Tipo de actividad Presentación de trabajo en congreso Congressional Edition XX Jornadas de Enseñanza Universitaria de la Informática Date:2014-07-10 JENUI 2014: Actas de las XX Jornadas sobre la Enseñanza Universitaria de la Informática: Oviedo, del 9 al 11 de julio de 2014 first page 363 last page 370 Editorial Universidad de Oviedo. Escuela de Ingeniería Informática Title: Controles de trabajo en grupo para mejorar la interdependencia positiva URL http://www.aenui.net/jenui2014/60.pdf

Diallo, D.; Arias, A.; Cathelin, J. Pages (inicial-final): 296-301 Congressional Edition: 1st International Conference on Green Energy Type: Article-Conference Paper ISBN: 978-1-4799-3601-4 Published: Green Energy, 2014 International Conference on. Institute of Electrical and Electronics Engineers (IEEE). 2014. Congressional Edition: Congrés place: Sfax Country: Tunísia Title: An inverter dead-time feedforward compensation scheme for PMSM sensorless drive operation

Doria-Cerezo, A.; Olm, Josep M.; di Bernardo, M.; Quaglia, M.; Nuño, E. Pages: 3677-3682 Congressional Edition: 53rd IEEE Conference on Decision and Control Type: Article-Conference Paper ISBN: 978-1-4673-6088-3 Published: Proceedings 53rd IEEE Conference on Decision and Control. Institute of Electrical and Electronics Engineers (IEEE). 2014. place: Los Angeles Country: USA Title: Bounded synchronization in resistive multi-terminal VSC-HVDC transmission systems

Ferrer, J.; Peña, M.; Susin, A.Pages: 90-92 Congressional Edition: Mathematical Models and Methods in Applied Sciences 2014 Type: Article-Conference Paper Published: Recent Advances in Mathematical Methods in Applied Sciences: proceedings of the 2014 International Conference on Mathematical Models and Methoks in Applied Sciences (MMAS'14), Saint Petersburg State Polytechnic University, Saint Petesburg, Russia, September 23-25, 2014. 2014. Congressional Edition: Congrés place: San Petersburg Country: Rússia Title: Tangency-saddle singularities of planar bimodal linear systems

Ferrer, J.; Peña, M.; Susin, A. Congressional Edition: 19th Conference of the International Linear Algebra Society Type: Article-Conference Paper Published: Abstracts. 2014. Congressional Edition: Congrés place: Seoul Country: Corea, República de Title: Closed orbits in planar bimodal linear systems

Ferrer, J.; Mingueza, D.; Montoro, M.E. Pages: 111-114 Congressional Edition: Encuentro de Álgebra Computacional y Aplicaciones 2014 Type: Abstract-Conference Paper ISBN: 978-84-697-0651-0 Published: Encuentros de álgebra computacional y aplicaciones. Barcelona 2014. Congressional Edition: Congrés place: Barcelona Country: Espanya Title: Determinant of any matrix that belongs to Z(J)

Langoyo, M.; Costa-Castelló, R. Pages: 370-377 Congressional Edition: XXXV Jornadas de Automática Type: Article-Conference Paper ISBN: 978-84-697-0589-6 Published: Actas de las XXXV Jornadas de Automática: 3-5 de septiembre de 2014, Valencia. Comité Español de Automática (CEAIFAC).2014. Congressional Edition: Jornada place: Valencia Country: Espanya Title: Respuesta frecuencial de los sistemas de tiempo discreto usando herramientas interactivas URL de la published: http://www.ja2014.upv.es/listado-de-contribuciones-las-jornadas/

Luna, J.; Acevedo, J.; Rosanas, N.; Costa-Castelló, R. Pages: 1-6 Congressional Edition: XXXV Jornadas de Automática Type: Article-Conference Paper ISBN: 978-84-697-0589-6 Published: Actas de las XXXV Jornadas de Automática, 3-5 de septiembre de 2014, Valencia. 2014. Congressional Edition: Seminari place: Valencia Country: Espanya Title: Nonlinear predictive control for the four-tanks plant flow regulation Grups de Recerca vinculats: ACES - Control Avançat de Sistemes d´Energia

Olm, Josep M.; Biel, D.; Fossas, E.; Cardoner, R. Journal : Journal of the Franklin Institute, vol. 351, Issue. 1, pages. 123-138 JCR-Science Edition (2013) Impact index: 2.26 ISSN: 0016-0032 Year: 2014 Quartile: Q1 Title: Fixed frequency sliding mode-based robust inversion with a full-bridge current DC-link buck-boost URL text: http://hdl.handle.net/2117/21626

Masalo Llora, Ingrid; Oca Baradad, Joan; Reig Puig, Lourdes; Pujadas, Ramon; Gómez, Raquel; Batlle, Montserrat Tipo de actividad Presentación de trabajo en congreso Nombre de la edición Aquaculture Europe 2014 Date 2014 "AQUA2014: Adding Value" first page P164 Title: Continuous control of total ammonia nitrogen (TAN) in seawater aquaculture tanks
URL https://www.was.org/easOnline/AbstractDetail.aspx?i=3638

Orellana, M.; Griño, R. Pages 1-6 Congressional Edition: 19th IEEE International Conference on Emerging Technologies and Factory Automation Type: Article-Conference Paper ISBN: 978-1-4799-4846-8 Published: ETFA 2014: 19th IEEE International Conference on Emerging Technologies and Factory Automation: September 16-19, 2014, Barcelona, Spain. Institute of Electrical and Electronics Engineers (IEEE). 2014 Congressional Edition: Congrés place: Barcelona Country:

Espanya Title: Design of discrete-time finite-gain resonators in AFC control URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7005024

Orellana, M.; Griño, R. Pages: 1-5 Congressional Edition: 11th International Multi-Conference on Systems, Signals & Devices Type: Article-Conference Paper ISBN: 978-1-4799-3867-4 Published: 11th International Multi-Conference on Systems, Signals & Devices (SSD), 2014: 11-14 Feb. 2014, Castelldefels-Barcelona, Spain. Institute of Electrical and Electronics Engineers (IEEE). 2014. Congressional Edition: Congrés place: Castelldefels, Barcelona Country: Espanya Title: Power flow limitations for LCL grid-connected power converters URL: http://ieeexplore.ieee.org/servlet/opac?punumber=6802828

Pastor Llorens, Enrique; Perez Batlle, Marcos; Royo Chic, Pablo; Cuadrado Santolaria, Raúl; Barrado Muxí, Cristina Tipo de actividad: Presentación de trabajo en congreso Nombre 4th SESAR Innovation Days Date 2014 Fecha de presentación 2014-11-25 Libro de actas Conference Papers Pages:1-10 Title: Real-time simulations to evaluate the RPAS integration in shared airspace URL: http://www.sesarinnovationdays.eu/sites/default/files/media/SIDs/SID%202014-41.pdf

Peña-Pitarch, E.; Ticó, N.; Abenoza, M.; Romero, G. Pages: 1-6 Congressional Edition: 3rd International Digital Human Modeling Symposium Type: Article-Conference Paper Published: Symposium proceedings: 3rd International Digital Human Modeling Symposium (DHM2014): 3rd International Summit on Human Simulation (ISHS 2014). 2014. Congressional Edition: Congrés place: Odaiba, Tokyo Country: Japó Title: Grasping simulation with a new device for a hand

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Prats Menéndez, Xavier; Perez Batlle, Marcos; Barrado Muxí, Cristina; Vilardaga García-Gascon, Santi; Bas, Isidro; Birling, Florent; Verhoeven, Ronald; Marsman, Adri Tipo de actividad Presentación de trabajo en congreso 14th AIAA Aviation Technology, Integration, and Operations Conference Fecha de published n2014 Fecha de presentación 2014-06 Proceedings of the 14th AIAA Aviation Technology, Integration, and Operations Conference Title: Enhancement of a time and energy management algorithm for continuous descent operations URL: http://arc.aiaa.org/doi/abs/10.2514/6.2014-3151

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Sarmiento Carnevali, Maria Laura; Batlle Arnau, Carles; Serra Prat, Maria; Massana Hugas, Immaculada Tipo de actividad Presentación de trabajo en congreso Nombre de la edición iberconappice 2014 Date Libro de Comunicaciones iberconappice 2014 First page 45 last page 48 Title: Distributed parameter PEMFC model order reduction URL http://hdl.handle.net/2117/24618

Sarmiento Carnevali, Maria Laura; Batlle Arnau, Carles; Massana Hugas, Immaculada; Serra Prat, Maria Tipo de actividad Presentación de trabajo en congreso Nombre de la edición European Hydrogen Energy Conference 12-14th

March, 2014. Seville, Spain Date 2014 Proceedings of 2014 European Hydrogen Energy Conference Primera página265 Última página272 Title: Order reduction of a distributed parameter PEM fuel cell anode gas channel model URL http://www.ehec.info/

Strahl, S.; Husar, A.; Riera, J.; Costa-Castelló, R . Pages 1-7 Congressional Edition: XXXV Jornadas de Automática Type: Article-Conference Paper ISBN: 978-84-697-0589-6 Published: Actas de las XXXV Jornadas de Automática, 3-5 de septiembre de 2014, Valencia. 2014. Congressional Edition: Seminari place: Valencia Country: Espanya Title: Control de temperatura en pilas de combustible tipo PEM de cátodo abierto

Vargas, H.; Costa-Castelló, R.; Pavez, S.; Farias, G.; Hermosilla, G.; Morales, J.; Dormido , S. Pages: 1385-1391 Congressional Edition: XVI Congreso Latinoamericano de Control Automático Type: Article-Conference Paper Published: Memorias del XVI Congreso Latinoamericano de Control Automático, CLCA 2014: octubre 14-17, 2014, Cancún, Quintana Roo, México. 2014. Congressional Edition: Congrés place: Cancún, Quintana Roo Country: Mèxic Title: Laboratorio de prácticas para la enseñanza de sistemas de control de tiempo real Grups de Recerca vinculats: ACES - Control Avançat de Sistemes d´Energia URL: http://amca.mx/AMCA2/Texto/CLCA2014.zip

Division of Industrial Engineering and Logistics

Corominas, A.; García-Villoria, A.; Calleja, G.; Pastor, R. Pages: 192-192 Congressional Edition: 20th Triennal Conference of the International Federation of Operation Research Societies Type: Abstract-Conference Paper Published: Proceedings of the IFORS 2014. 2014.Barcelona Country: Espanya Title: MILP-based tabu search using corridor method for an assembly line balancing problem with accessibility Windows

Calleja, G.; Corominas, A.; García-Villoria, A.; Pastor, R. Pages (inicial-final): 191-191 Congressional Edition: 20th Triennal Conference of the International Federation of Operation Research Societies Type: Abstract-Conference Paper Published: Proceedings of the IFORS 2014. 2014. Congressional Edition: Congrés place: Barcelona Country: Espanya Title: The accessibility windows assembly line balancing problem (AWALBP): a review of advances and trends

Domenech, B.; Ferrer-Martí, L.; Pastor, R. Congressional Edition: International Conference on OR for Development 2014: the art of modelling, the challenges of implentation Type: Abstract-Conference Paper Published: The Art of modeling,

challenges of implementation: International conference on OR for development, July 10-11, 2014:accepted papers. 2014. Congressional Edition: Congrés place: Lleida Country: Espanya Title: Methodology for the design of hybrid wind-PV stand-alone electrification projects URL: http://ifors.org/icord2014/accepted_papers.html

Domenech, B.; Ranaboldo, M.; Ferrer-Martí, L.; Pastor, R. Pages: 60-65 Congressional Edition: 7th International Conference on PV-Hybrids and Mini-Grids Type: Article-Conference Paper ISBN: 978-3-943891-37-9 Published: Proceedings of 7th International Conference on PV-Hybrids and Mini-Grids. Ostbayerisches Technologie-Transfer-Institut e.V.. 2014. Congressional Edition: Congrés place: Bad Hersfeld Country: Alemanya Title: Methodology for designing stand-alone wind-PV community electrification projects considering technical and social constraints URL: http://energie.otti.de/pv_hybrids14_proceedings/

Ferrer-Martí, L.; Marianna Garfi'; Ferrer, I. Congressional Edition: International Congress on Education, Innovation and Learning Technologies 2014 Type: Article-Conference Paper Published: International Congress on Education, Innovation and Learning Technologies. 2014. Congressional Edition: Congrés place: Barcelona Country: Espanya Title: Evaluating an internship program to conduct cooperation and development projects as bachelor, master and phd thesis

Ferrer-Martí, L.; Santos, M.; Minguella-Canela, J.; Guilera, A.; Ranaboldo, M.; Sararols, M. Congressional Edition: International Congress on Education, Innovation and Learning Technologies 2014 Type: Article-Conference PaperPublished: International Congress on Education, Innovation and Learning Technologies. 2014. Congressional Edition: Congrés place: Barcelona Country: Espanya Title: Simulation applied to real case studies to enhance transportation education in engineering courses

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Ferrer-Martí, L.; Santos, M.; Minguella-Canela, J.; Guilera, A.; Ranaboldo, M.; Sararols, M. Congressional Edition: VIII International Conference on University Teaching and Innovation Type: Article-Conference Paper Published: VIII International Conference on University Teaching and Innovation (CIDUI). 2014. Congressional Edition: Congrés place: Tarragona Country: Espanya Title: Enhancing transportation education through simulation and real case studies

Martinez, M.; Mateo, M.; Lusa, A. Pages: 111-111 Congressional Edition: 8th International Conference on Industrial Engineering and Industrial Management Type: Abstract-Conference Paper ISBN: 978-84-617-0923-6 Published: 8th International Conference on Industrial Engineering and Industrial Management. 2014. Legal deposit: MA 1257-2014 Congressional Edition: Congrés place: Málaga Country: Espanya Title: A MILP model for the Strategic Capacity Planning in consultancy

Mesa, D.; Martinez, M.; Mas, M.; Uribe, F. Type: Ponència Congressional Edition: 43rd European Marketing Academy Annual Conference place: Valencia Country: Espanya Congressional Edition: Congrés Published: Pàg.238-238. Date: 06/06/2014 Title: The effect of firm size, sector and age in the relation between proactive marketing and firm performance in times of crisis: a multigroup analysis

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Division of Robotics

Alvarado, N.; Suarez, R.. Searching force-closure optimal grasps of articulated 2D objects with n links. Proceedings of the 19th IFAC World Congress, 2014. Place of publication: Cape Town, Sud-àfrica. Editorial: International Federation of Automatic Control (IFAC). Year: 2014. Pages: 8024~8029. ISBN/ISSN: 978-3-902823-62-5.
URL text: http://www.ifac-papersonline.net/Detailed/67793.html.

Fontanals, J.; Dang-Vu, B.; Roa, M.A.; Rosell, J.; Porges, O. Pages: 887-893 Congressional Edition: 14th IEEE-RAS International Conference on Humanoid Robots Type: Article-Conference Paper ISBN: 978-1-4799-7173-2 Published: Proceedings of the IEEE-RAS 2014 International Conference on Humanoid Robots. Institute of Electrical and Electronics Engineers (IEEE). 2014. Congressional Edition: Congrés place: Madrid Country: Espanya Title: Integrated grasp and motion planning using independent contact regions URL: http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?reload=true&punumber=7028729

Montaño, A.; Suarez, R.. Getting comfortable hand configurations while manipulating an object. ETFA 2014: 19th IEEE International Conference on Emerging Technologies and Factory Automation: September 16-19, 2014, Barcelona, Spain. Place of publication: Barcelona, Espanya. Editorial: Institute of Electrical and Electronics Engineers (IEEE). Year: 2014. Pages: 1 ~ 8. ISBN/ISSN: 978-1-4799-4846-8. URL text:

Rodriguez, C.; Montaño, A.; Suarez, R.. Optimization of robot coordination using temporal synchronization. ETFA 2014: 19th IEEE International Conference on Emerging Technologies and Factory Automation: September 16-19, 2014, Barcelona, Spain. Place of publication: Barcelona, Espanya. Editorial: Institute of Electrical and Electronics Engineers (IEEE). Year: 2014. ISBN/ISSN: 978-1-4799-4846-8. URL text: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7005024.

Rosell, J.; Suarez, R.. Using hand synergies as an optimality criterion for planning human-like motions for mechanical hands. Proceedings of the IEEE-RAS 2014 International Conference on Humanoid Robots. Place of publication: Madrid, Espanya. Editorial: Institute of Electrical and Electronics Engineers (IEEE). Year: 2014. Pages: 232 ~ 237. ISBN/ISSN: 978-1-4799-7173-2. URL text: http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?reload=true&punumber=7028729

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Books

Division of Automatic Control

Costa-Castelló, R.; Fossas, E. Title: Sistemes de control en temps discret Grups de Recerca vinculats: ACES - Control Avançat de Sistemes d´Energia ISBN: 978-84-9880-463-8 legal deposit: B-26548-2014 Editorial: Universitat Politècnica de Catalunya. Iniciativa Digital Politècnica URL del llibre: http://upcommons.upc.edu/llibres/handle/2099.3/36857

Book chapters

Division of Industrial Engineering and Logistics

De La Torre, R.; Lusa, A.; Mateo, M. Title del capítol: Methodology for the strategic capacity planning in universities Title del llibre: Managing complexity. Challenges for industrial engineering and operations management. Lecture notes in management and industrial engineering 2014 ISBN: 978-3-319-04705-8 Editorial: Springer Pages: 333-340 URL: http://link.springer.com/book/10.1007%2F978-3-319-04705-8

Martinez, M.; Lusa, A.; Mas, M.; De La Torre, R.; Mateo, M. Title del capítol: Strategic capacity planning in KIOs: A classification scheme Title: Annals of industrial engineering 2012. Industrial engineering: overcoming the crisis ISBN: 978-1-4471-5348-1 Editorial: Springer Pages: 191 URL: http://link.springer.com/chapter/10.1007%2F978-1-4471-5349-8_28#!

Mateo, M.; Aghezzaf, E. Title del capítol: Integrating Vendor Managed Inventory and Cooperative Game Theory to Effectively Manage Supply Networks Title: Applications of multi-criteria and game theory approaches 4471-5294-1 ISBN: 978-1-4471-5295-8 Pages:263-288 URL http://www.springer.com/engineering/production+engineering/book/978-1-

Moline, Joan I; Coves, A. Title del capítol: Supplier evaluation and selection: a review of the literature since 2007 Title del llibre: Managing complexity. Challenges for industrial engineering and operations management. Lecture notes in management and industrial engineering 2014 ISBN: 978-3-319-04705-8 Year 2014 Pages: 217-224 Editorial: Springer URL: http://link.springer.com /book/10.1007%2F978-3-319-04705-8

Olivella, J.; Calleja, G. Title del capítol: The staffing process in a high-technology environament Title del llibre: Human resource management and technological Pages :133-148 URL del capítol de llibre: http://link.springer.com/chapter/10.1007/978-3-319-02618-3_7

Pinto, C; Coves, A. Title del capítol: The reduction of CO2 emission 3 into the supply network design: 4 A review of current trends 5 in mathematical models Title del llibre: Annals of Industrial Engineering 2012 ISBN: 978-1-4471-5348-1 Editorial: Springer Year 2014. Pages: 131-138 URL: http://link.springer.com/chapter/10.1007%2F978-1-4471-5349-8_16

Reports

Division of Industrial Engineering and Logistics

Bautista, J.; Companys, R.; Corominas, A. Title: Modelos y algoritmos para la determinación de secuencias regulares en líneas de montaje mixtas con restricciones en la elaboración de productos Descripció: Secuencias regulares con restricciones de cargas en la elaboración de productos 08/08/2014 Pages: 27

Bautista, J.; Companys, R.; Corominas, A. Title: Introducción al BDP Descripció: Aproximación teórica a la Programación Dinámica Acotada (Bounded Dynamic Programming) a través de la Programación Dinámica (Dynamic Programming) y la Exploración Arborescente (Branch and Bound).Data: 22/08/2014 Pages: 9 URL: http://upcommons.upc.edu/e-prints/urlFiles?idDrac=550465

Ranaboldo, M.; García-Villoria, A.; Ferrer-Martí, L.; Pastor, R.Title: A GRASP based method to design off-grid community electrification projects with renewable energies URL: http://hdl.handle.net/2117/24596

Lectures

Division of Automatic Control

Costa-Castelló, R. Data celebració:13/02/2014 Nom conferència o cicle:Invited Speaker at the 11th International Multi-Conference on Systems, Signals & Devices place: Castelldefels Country: Tipus conferència: Activitat acadèmica Title conferència impartida:On Tracking and Rejecting Periodical Signals

Division of Robotics

Suarez Feijóo, R. Data celebració: 04/12/2014 Nom conferència: Sujeción de objetos articulados y manipulación basada en información táctil Entitat: Universidad Nacional de Cuyo place: Mendoza Country: Argentina Tipus: Conferència.

Suarez Feijóo, R. Data celebració: 10/12/2014 Nom conferència: Manipulación robótica Entitat: Universidad Nacional de San Luis place: San Luís Country: Argentina Tipus: Conferència.

11. Extracurricular activities

Executive en Lean Supply Chain Management. Direcció d'Operacions I Logística - Master's degree. Face-to-face.

Academic management: Rúa Costa, Carles

Presentation

15th year

Traditional functions in companies such as production, distribution, planning or logistics have evolved with the change in economic cycles. The productive function has adapted to the new needs of markets, incorporating new trends such as Lean Manufacturing¿ and embracing quality control, training or staff motivation as part of its tasks. Likewise, logistics have also changed, and the concept Integrated Logistics has come to comprise all the value chain between the customer and the supplier, as well as the flow of information and materials.

Integrated management of the distribution chain, production and supplies is now known as Supply Chain Management. The emergence of logistics has forced governments to work on improving and updating infrastructures roads, railway, ports and airports and this, together with staff training and research and innovation as key aspects to increase the level of competitiveness in the business fabric.

This Masters Degree aims to be unique and exclusive, a reference point for all professionals aiming to develop their career in the areas of logistics, distribution, supplies and, in general, any aspect relating to the supply chain management and design. To make this possible, the course has included prestigious professionals from the main European universities (CRANFIELD) and leading schools in specific areas (European Short Sea Shipping School). For this Masters we also have the collaboration of managers from the leading logistics companies in Spain, who will transmit their experiences to the students.

AIMS

- TO PUT INTO QUESTION THE CURRENT ORGANISATIONAL AND MANAGEMENT SYSTEMS IN THE LOGISTICS CHAIN.
- TO STRATEGICALLY ANALYSE, ORIENT AND DEFINE THE ENTIRE LOGISTICS CHAIN AND ALL OF ITS DIFFERENT SECTORS, IMPLEMENTING AND ADAPTING NEW TECHNOLOGIES TO BOOST COMPANIES LOGISTICS SERVICES.
- TO DESIGN AND IMPLEMENT NEW SYSTEMS AND METHODOLOGIES TO IMPROVE THE MANAGEMENT OF THE RELATIONSHIPS AMONG PROVIDERS, BUSINESSES, OPERATORS AND END CLIENTS.
- TO EFFECTIVELY MANAGE PERSONNEL TEAMS THAT NEED TO COLLABORATE WITH THE CULTURAL CHANGE IMPLIED IN IMPLANTING AN INTEGRATED STRATEGY OF SUPPLY CHAIN MANAGEMENT

Font: http://www.talent.upc.edu/cat/professionals/presentacio/codi/203200/executive-lean-supply-chain-management-direccio-operacions-logistica/