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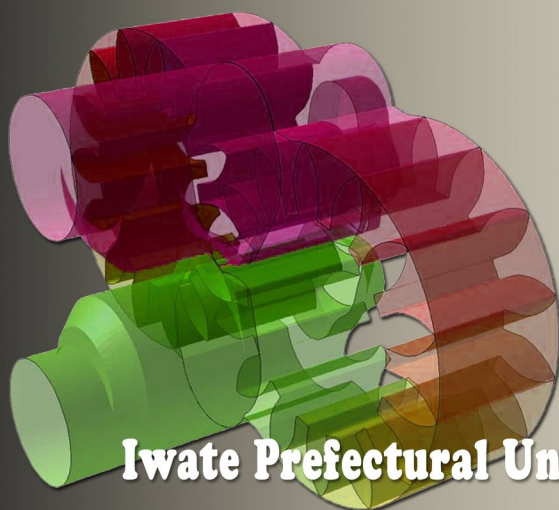
Associate Editor: G. Guizzi



Selected Topics in System Science & Simulation in Engineering

**9th Wseas International Conference on
System Science and Simulation in Engineering
(ICOSSE '10)**

Sponsor and Organizer



Iwate Prefectural University, Japan, October 4-6, 2010

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Preface

This year the 9th WSEAS International Conference on SYSTEM SCIENCE and SIMULATION in ENGINEERING (ICOSSE '10) was held at the Iwate Prefectural University, Japan, October 4-6, 2010. The conference remains faithful to its original idea of providing a platform to discuss systems theory, control systems, stochastic systems, non-linear systems, multidimensional systems, multivariable systems, simulation environments, petri nets etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

On-line Assessment of the Manufacturing System Competitiveness



Associate Professor Daniela Ghelase

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Abstract: A company is competitive on a certain market when it succeeds to reach, up to an acceptable level, some economic indicators: turnover, profit, market share comparable or superior to that of other competing companies acting on the same market. Many approaches to the problem of competitiveness show that, today, competitiveness is defined by the economic factors and indicators and is more a suggested/induced notion than a numerically evaluated one. The approaches are of economic and managerial nature, while the relationship with the technical aspects of competitiveness is less noticeable.

At this point there is no algorithm to evaluate the technical and economic competitiveness, moreover, the technical factors are not considered, although consumption and costs incurred by the manufacturing processes are generated by technical actions. In this context, the notion of competitiveness gains new valences, including factors and policies that determine the ability of the enterprise to get a favorable place on the market, to maintain that place and to continuously improve its position. Only in this way the competitiveness fully and synthetically characterizes the enterprise viability.

In this lecture, competitiveness will be understood as the capacity (potential) to provide performance (compared with other similar elements), in a very punctual way, within a concrete microeconomic context and at a certain time. Moreover, according to a metric of competitiveness (considered as an essential performance indicator) it will be assessed the extent to which the company achieves the purpose for which it has been created. Therefore, this lecture aims at making an algorithm for numerical on-line assessment of the technical-economic competitiveness.

A case study referring to the assessment algorithm is presented, showing the use of the algorithm in the on-line management of the manufacturing system to obtain maximum competitiveness.

Brief Biography of the Speaker:

Daniela Ghelase graduated from the "Politehnica" University of Bucharest in 1985 (the Faculty of Machine Manufacturing).

In 2002, she got her PhD in Industrial Engineering at "Dunarea de Jos" University of Galati.

Her research fields include: flexible systems manufacturing, numerical simulation of manufacturing processes and surfaces generation, optimal computer-aided design of gear-sets, quality assurance and management.

Dr. Ghelase is Associate Professor at the Faculty of Engineering Braila, "Dunarea de Jos" University of Galati. She published, as author or co-author, over 80 articles in journals and in proceedings of international conferences (Hungary, Italy, Hong Kong, Spain, Portugal, Poland, South Africa, Ukraine, Bulgaria, Moldavia, USA).

Daniela Ghelase wrote 5 books in her research field. In 2005 she was visiting professor at The City University of Hong Kong.

She is a member of the following professional and scientific associations: IFAC – International Federation of Automatic Control, SAAM - South African for Theoretical and Applied Mechanics, ARoTMM - Romanian Association for Theory of Machines and Mechanisms, ACM-V - Multidisciplinary Research Association of the West Zone.

Dr. Daniela Ghelase is an Expert of Romanian National University Research Council – CNCSIS.

Plenary Lecture 2

The Role of Reinforcement Learning in Business Integrated Manufacturing



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Abstract: All over the world, companies are faced with increasingly accelerated and unpredictably dynamic changes. This is influenced by the scientific, technical progress and the dynamics of customers' demands. Changes lead to aggressive competition on a global scale, which calls for the establishment of new balances between economy, technology and society.

Reinforcement learning (RL) has received some attention in recent years from researchers, because it deals with the problem of how an autonomous manufacturing system can learn to select proper actions for achieving its goals through interacting with its environment. Although there have been several successful examples demonstrating the usefulness of RL, its application to business integrated manufacturing has not been fully explored yet. The interaction between the economic environment and the manufacturing system is a major source of knowledge about the economic environment and the manufacturing system themselves.

The reinforcement learning, through its role, in business integrated manufacturing, means the manufacturing system capacity to 'learn' in permanent interaction with the economic environment, to inform and update the information about the auctions and to anticipate, before deciding to conclude a contract, the level of costs, profit and what is the best way to act. In other words this means that the manufacturing system 'learns' what actions to take in certain situations, based on the data supplied by the economic environment, so that such actions increase the possibilities of achieving the aim proposed.

The business integrated manufacturing should 'exploit' what it already knows to obtain profit, but at the same time it must 'explore' the possibility of finding other suitable actions for the future. The manufacturing system should try a variety of actions and then choose those that seem best. This study shows the potential of RL for application to the business integrated manufacturing.

Brief Biography of the Speaker:

Luiza Daschievici got a Master's degree in Mechanical Engineering in 1994.

In 2000 Luiza Daschievici got a PhD in Mechanical Engineering ("Dunarea de Jos" University of Galati).

Since 1994, she has been an assistant, then lecturer and associate professor at "Dunarea de Jos" University of Galati.

Her research fields are the following: technology of the manufacturing process; cutting process modeling; tribology of parts machines; techniques of complex modelling of the manufacturing systems; the reliability of the mechanics systems.

Dr. Daschievici Luiza has participated in many research projects organized by Romanian Ministry of Education and Science.

She published, as author or co-author, over 80 articles in journals and proceedings of the international conference (Hungary, Italy, Hong Kong, Spain, Portugal, Poland, South Africa, Ukraine, Bulgaria, Moldavia, USA). Daschievici Luiza wrote 5 books in her research field.

She is a member of the following professional and scientific associations: IFAC – International Federation of Automatic Control, SAAM - South African for Theoretical and Applied Mechanics, ARoTMM - Romanian Association for Theory of Machines and Mechanisms, ACM-V - Multidisciplinary Research Association of the West Zone.

Dr. Daschievici Luiza is an expert of Romanian National University Research Council – CNCSIS.

Plenary Lecture 3

Simulation, Artificial Intelligence and Virtual Systems Applications in Industrial Processes Education



Professor Francklin Rivas-Echeverria

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Abstract: Simulation has become a powerful tool for system's design, analysis and optimization in industrial processes. Every day there are more powerful computers, with cheapest costs and easy for use. Also, software or application programs with highly flexible programming languages, has allowed the wide use of different simulation techniques in processes control.

Artificial intelligence is one of the scientific areas with greater diffusion and application in the last years. Every day is more common to find tools for industrial, commercial or academic use that involve the use of intelligent techniques in the resolution of critical and recurrent problems, due to their simplicity, implantation facilities and design characteristics.

Virtual systems, allow creating similar environments as the ones found in industrial processes, that can be used for accumulating knowledge and experiences that could be later used in real conditions. These virtual systems can support the learning, emulating real situations and have been widely used in engineering field applications.

The joint use of the three previously mentioned areas can be a powerful tool for decision making that allows, among other things:

- To predict the result of the actions that has been taken on the process or control system.
- To understand the reasons for events occurrence.
- To identify conflictive areas before the system installation.
- To explore the effects of some modifications given to the system.
- To evaluate ideas and their viability, and to identify their problems.
- To stimulate the creative and to train personnel.
- To optimize processes (energy savings, bottle necks, results improvements, etc.).

In this Plenary Speech, it will be presented diverse applications of Simulation, Artificial Intelligence and Virtual Systems in Industrial Processes Education, It will be also considered the methodological framework for designing this applications.

Brief Biography of the Speaker:

Francklin Rivas-Echeverria Systems Engineer, MSc. in Control Engineering and Applied Science Doctor. Full professor in Control Systems Department, at Universidad de Los Andes, Venezuela. He has been invited professor in the Laboratoire d'Architecture et d'Analyse des Systemes (LAAS, Toulouse-France) and some Venezuelan and international Universities. He has also been technical advisor for "Venezuelan Oil Company" (PDVSA), "Aluminum Venezuelan Company" (VENALUM), "Steel Venezuelan Company" (SIDOR), Trolleybus System in Venezuela (TROLLMERIDA). He has created and is the Director of the Intelligent Systems Laboratory and is the head of the University consulting unit (JAPIT-ULA). Over 180 publications in high level conferences and journals: the main topics of his papers are: Artificial Intelligence, Intelligent Control, Automation Systems and Industrial Applications. He has applied his results to many fields: Processes Control and Supervision, Oil production, Steel production processes, among others. Also, has developed several tools for automatic control teaching. He is coauthor of two books concerning Artificial Intelligence and Nonlinear Systems.

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