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SELECTED TOPICS ON ENERGY AND DEVELOPMENT - ENVIRONMENT - BIOMEDICINE 2009

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Proceedings of the 3rd International Conference on Energy & Development - Environment - Biomedicine (EDEB'09)

Vouliagmeni, Athens, Greece, December 29-31, 2009

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Plenary Lecture 1

Systems Thinking Integrated System Approach to Sustainable Management

Assistant Professor Davorin Kralj
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One of the key reasons for the problems of today is the absence of an integral approach in planning or drafting development strategies. Sustainable development is in no case a neutral concept, since it intervenes on all fields of economic, environmental and social life. The dawn of the twenty-first century, sustainable business development is coming of age. Leading global corporation are embracing sustainable business development as a strategic framework for integrating their business enterprises, creating innovative solutions to the complex needs and requirements of the business environment, and thinking strategically about leading change. The theory on the basis of the practical experiences envisages sustainable development planning as a process of continuous improvement.The successful green development and implementation of green innovation in an organizational system can produce a significant saving in the amount of business and environment resources and therefore a smaller environmental impact. Integrated system approach integrates the requirements of sustainable green development and environmental excellence with other business requirements. The last three decades have witnessed a radical change in world and regional circumstances as well as in social and entrepreneurial ones. Consequently, following a holistic approach to competitiveness, it is of utmost importance to consider all the relevant factors of competitiveness. These factors could be subdivided into systemic thinking, production processes management, sustainable management and business/environmental excellence. Moreover, competitiveness is the basis for successful company performance as well as for a better quality of life. Modern trends requiring systems thinking and integrated system approach to sustainable management.

Dr. Davorin Kralj completed his undergraduate studies at the University of Maribor, Faculty of Chemistry and Chemical Engineering (1987) and post-graduate study at the University of Maribor- Faculty of Organizational Sciences, in the area of Integral Quality Management (1991) and also post-graduate master' study program Management and Organization - MBA at Faculty for Economics and Business in Maribor (2008). In 2009 he holds a Ph.D. in the field of Chemistry and Chemical Engineering. In 2006 he started his second doctoral study program at the Faculty of Economics in Ljubljana. His main teaching and research areas include organizational sciences, environmental management and sustainable development. He has authored or co-authored various scientific papers and environmental patents. He has been awarded numerous certificates and awards. In 2008, have been distinguished with the silver award during the China Association of Inventions and IFIA International Federation of Inventors' Associations, the silver award during the International Jury of IENA 2008 and award of the Best Eco Inventor during the WIPO World Intellectual Property Organization.

Plenary Lecture 2

Renewable Energy Equipments Operation Special Application Problems Simulation, with Focus on Wind and Water Energy Sources

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The large scale application of renewable energy utilization leads to an important power equipments solutions and operation diversification, and to complex emplacement. Compact groups of devices become real competitors on energy producing market. Design and operation approached is already changed from the individual solutions, with limited application for isolated emplacements, to a new approach considering the networks connections capabilities, providing equipments balance, different energy sources alternatively or simultaneously operation, and reciprocating operation interaction. The wind and water energy producing devices are holding the leadership facing others, but photovoltaic devices are the most dynamic. For different reasons, for both wind and hydro turbines, one of the most sensitive aspects is the balance of the whole aggregates operation components. The actual simulation methods offer relevant information on the component behaviour in assemblies. The paper presents such a model of simulation and emphases conclusions on the turbines stable operation. The conclusions can be applied in the future for a whole group of devices working together evaluation.

Mircea Grigoriu is assistant professor of Department of Energy and Environmental Engineering, University POLITEHNICA of Bucharest, Romania, where he is also the coordinator of the Hydraulic Machineries Laboratory and director of the Romanian Cleaner Production Center. His main research interests concern Pumping systems energy efficiency and the energy savings and environmental impact; Pumping systems design, operation, automatics, diagnostics and protection; Climate changes assessment; Management systems. In these fields, he authored or co-authored over 50 scientific papers published in reviewed journals or presented at international conferences. He was minister of Environment counselor, national focal point of the UNFCCC of Romania and now is listed in the Roster of experts of UNFCCC. He is technical counselor of important pumping equipments producers. He is a redactor at the Energetica Journal edited by the National Energy Producers Association (IEA), representing Eurelectric in Romania.

Plenary Lecture 3

The Constructions of Implant Joints on Basis of Elastic Hydrodynamic Theory of Lubricant

Dr. Vladyslav Vlastopulo
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Till now there are no man-made joints exist, which can be made in image and likeness of elastohydrodynamical implant joint. In joint constructions the contact pressures zone, thickness and temperatures contact layer doesn't take in consideration. The elastohydrodynamical frictional joint experience of knowledge isn't taken in consideration sufficiently.
The knee implants of elderly people get loose, the clearance and depreciation become bigger in the course of time. The bones loss the mass and thin, as a result of osteoporosis, and there is an increase of bending moment, torque and wear of joint (J. P. Kretzer, E. Jakubowitz, K. Hofmann, J. Reinders, "Altered wear behavior of artificial knee implants", Laboratory of Biomechanics and Implant Research, Department of University of Heidelberg, Germany. The World Congress on Medical Physics and Biomedical Engineering, on September 7 – 12, 2009, in Munich, Germany).
We've developed such methods:
-methods of measurements of hydrodynamic pressures developing in the lubricant layer on friction surfaces, 1957, direct measurements over the bearing's circumference:
-method and sensors for measurements of clearance and pressure or supporting film of lubricant in plain bearings, direct and continuous measurements over the bearing circumference, which do not require interpretation by using calibration curves, 1979:
-sensor for the temperature measuring of lubricant film in plain bearings, direct and continuous measurements over the bearing's circumference: the sensor is capable of measuring the lubricant's film temperature directly using infrared radiation. 1978.
-test bed for plain bearings, 1960.
-sensors for determination of standard elasticity modulus of plain bearings continuous, over circumference of the bearing material, direct measurement modulus by optic method. 1991.
-developed the experimentally grounded theory of the Thermoelastohydrodynamic Lubrication of tribosystems of human joints and based on it half-empiric calculations, 2000.
-Created constructions of human joints are practical in surgical using on base of thermoelastic hydrodynamical theory of plain bearing with leveling of contact hydrodynamic joint zone, equal firm joint from polymer composite materials, joint off Vlastopulo V.I. for controlled friction of tribosurfaces, 2009.

Dr. Vladyslav Vlastopulo is a scientifically-commercial director of biophysical department on creating of new biomedical methods and devices, bio-field simulators in "Research Laboratories VVL", Odessa, Ukraine, and professor of cathedra of ways and methods of struggling with marine corrosion and biological fouling in Odessa Marine University. His research interests are related to biomedical, tribologycal, biotribologycal and mechanical engineering and also biophysics, bio-field simulators, computer fragmentary treatment of diseases demanding the operations, drug abuse patients, obesity patients, the using in video, audio products for creating attracted bioenergetic advertisement, creation of joints on basis of hydrodynamical lubricant theory. He has more than 120 papers, abstracts, book chapters and technical reports in biomedical, tribologycal, biotribologycal and mechanical engineering, and 50 of them are inventions of Soviet Union, Russian Federation and Ukraine. He is a member of more than 20 international conferences on mechanical, biomedical, tribologycal engineering.

Plenary Lecture 4

Critical Node Detection Problem

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Identifying critical nodes in a graph is important to understand the structural characteristics and the connectivity properties of the network. In this talk, we focus on detecting critical nodes, or nodes whose deletion results in the minimum pair-wise connectivity among the remaining nodes. This problem, known as the critical node problem has applications in several fields including biomedicine, telecommunications, and military strategic planning. We formulate the problem as an integer linear programming problem and we prove that it is an NP complete problem. We present computational results using a heuristic especially tailored for this problem. We compare the performance of the heuristic with the integer programming approach. For all instances tested, the quality of the solution provided by the heuristic was always superior compared to the commercial software package.

Dr. Panos Pardalos is Distinguished Professor of Industrial and Systems Engineering at the University of Florida. He is also affiliated faculty member of the Computer Science Department, the Hellenic Studies Center, and the Biomedical Engineering Program. He is also the director of the Center for Applied Optimization.
Dr. Pardalos obtained a PhD degree from the University of Minnesota in Computer and Information Sciences. He has held visiting appointments at Princeton University, DIMACS Center, Institute of Mathematics and Applications, FIELDS Institute, AT&T Labs Research, Trier University, Linkoping Institute of Technology, and Universities in Greece.
He has received numerous awards including, University of Florida Research Foundation Professor, UF Doctoral Dissertation Advisor/Mentoring Award, Foreign Member of the Royal Academy of Doctors (Spain), Foreign Member Lithuanian Academy of Sciences, Foreign Member of the Ukrainian Academy of Sciences, Foreign Member of the Petrovskaya Academy of Sciences and Arts (Russia), and Honorary Member of the Mongolian Academy of Sciences. Dr. Pardalos received the degrees of Honorary Doctor from Lobachevski University (Russia) and the V.M. Glushkov Institute of Cybernetics (Ukraine), he is a fellow of AAAS, a fellow of INFORMS, and in 2001 he was awarded the Greek National Award and Gold Medal for Operations Research.
Dr. Pardalos is a world leading expert in global and combinatorial optimization. He is the editor-in-chief of the Journal of Global Optimization, Journal of Optimization Letters, and Computational Management Science. In addition, he is the managing editor of several book series, and a member of the editorial board of several international journals. He is the author of 8 books and the editor of several books. He has written numerous articles and developed several well known software packages. His research is supported by National Science Foundation and other government organizations. His recent research interests include network design problems, optimization in telecommunications, e-commerce, data mining, biomedical applications, and massive computing.
Dr. Pardalos has been an invited lecturer at many universities and research institutes around the world. He has also organized several international conferences.

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