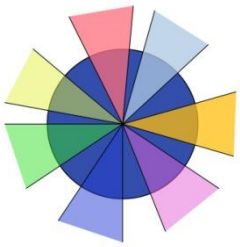

Book of Abstracts State of the Art Workshop

26th European Conference on Operational Research

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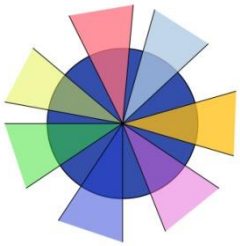
Volume 27

Dorien DeTombe, Cathal Brugha, Gerhard-Wilhelm Weber, Fred Wenstøp (Eds.)



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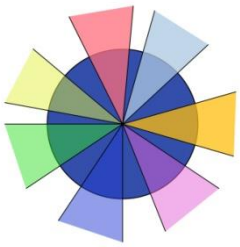


Satellite Event State of the Art Workshop EURO XXVI ROME 2013

The goal of the State of the Art Workshop on Societal Complexity is to give the Chairs of the Euro Working Groups Operational Research EUROMSC / EURO MCDA / EUROPT / EURO ORD / Ethics and OR. The chairs are doing research in overlapping fields of societal complexity such as in ethics, decision making and developing countries, the opportunity to meet and discuss with each other interesting content matters concerning the latest developments in their field. In the State of the Art Workshop platform top researchers have the opportunity to discuss the problematic and difficult issues in their research among each other. In the workshop of half a day, each researcher gives a short overview of his/her research field. In this multi-disciplined research group of highly scholar and experimented researchers, the researchers have the opportunity to discuss the questions and issues in the field of societal complexity that interest them most. Each researcher gives an overview of recent developments in their research field and discus the future research questions, including interesting literature with a special focus on problems in research, urgent societal issues and uncertainties.

Prof. Dr. Dorien DeTombe
Prof. Dr. Cathal Brugha
Prof. Dr. Gerhard Wilhelm Weber
Prof. Dr. Fred Wenstøp

A workshop related to EURO XXVI conference of a co-operation of the Euro Working Groups:

EWG Methodology for Complex Societal Problems
Euro MCDA
EWG EUROPT
EURO Continuous Optimization
OR for Development
EURO Working Group on Ethics and OR

Organized by

Prof. Dr. Dorien DeTombe EWG Methodology for complex societal problems
OR for development

Prof. Dr. Cathal Brugha http://analyticsinstitute.org Euro MCDA

Prof. Dr. Gerhard–Wilhelm Weber EWG EUROPT, EURO Continuous Optimization
OR for development

Prof. Dr. Fred Wenstøp EURO Working Group on Ethics and OR

Contact:

Prof. Dr. Dorien DeTombe
Chair EUROMSC
International Research Society on Methodology of Societal Complexity
P.O. Box. 3286, NL-1001 AB Amsterdam, The Netherlands, Europe
Tel: +31 20 6927526 DeTombe@nosmo.nl
http://www.complexitycourse.org/doriendetombe.html

Program Satellite event State of the Art Workshop Rome 2013

1 Inter-Religious Conflict Resolution

Cathal Brugha

Prof. Dr. Cathal Brugha
Centre for Business Analytics
University College Dublin, Ireland
Cathal.Brugha@ucd.ie

This paper contextualizes religious-political interaction as a mutual adapting process starting with Hegel's proposals about the separation of church and state to prevent Conflict, then moving to Confrontation firstly in terms of the freedom to act productively as in Rawls, and then to promote the common interests of society without being abused as proposed by Habermas.
The paper uses a conflict-resolution meta-framework to propose where the discussion should go in the future, which is into Cooperation, where people with different views openly discuss what they have in common, such as belief in God, the good of society, peaceful coexistence, etc. and work together to foster what they have in common, to develop trust, and to build relationships.
It also uses the same framework to map the difficulties with this process, and to show why the final phase of Collaboration is so far from our grasp.

Keywords: Philosophy, Politics, Religion

2 A new theory of identifying multi-dimensional dynamics under uncertainty by using CMARS method

Fatma Yerlikaya-Özkurt and Gerhard-Wilhelm Weber

Prof. Dr. Gerhard-Wilhelm Weber
Dr. Fatma Yerlikaya-Özkurt
Middle East Technical University
Institute of Applied Mathematics
ODTU Ankara 06531 Turkey
Tel: 90 - 312- 210- 5652 Fax: 90 - 312- 210- 2985
gweber@metu.edu.tr

In this presentation, a theoretical framework for estimating multi-dimensional stochastic differential equations (SDEs) by conic multivariate adaptive regression splines (CMARS) will be provided as a promising future research area. In fact, those SDEs are of growing importance for the representation and treatment of real-world developments under stochastic uncertainty, in all areas of academic life and real-world practice. SDEs are widely used to represent noisy and real-world problems. However, dealing with multi-dimensional stochastic equations is a mathematically challenging issue due to computational difficulties and complexity. This challenge can be treated by discussing the corresponding parameter estimation problem through Tikhonov regularization, conic quadratic programming and CMARS method. This presentation will finish by concluding remarks and an outlook at future research and application, especially, in our OR community and for improvements in economy and the living conditions of the people.

Keywords: Conic Quadratic Programming; CMARS Method; Multi-Dimensional Stochastic Differential Equations

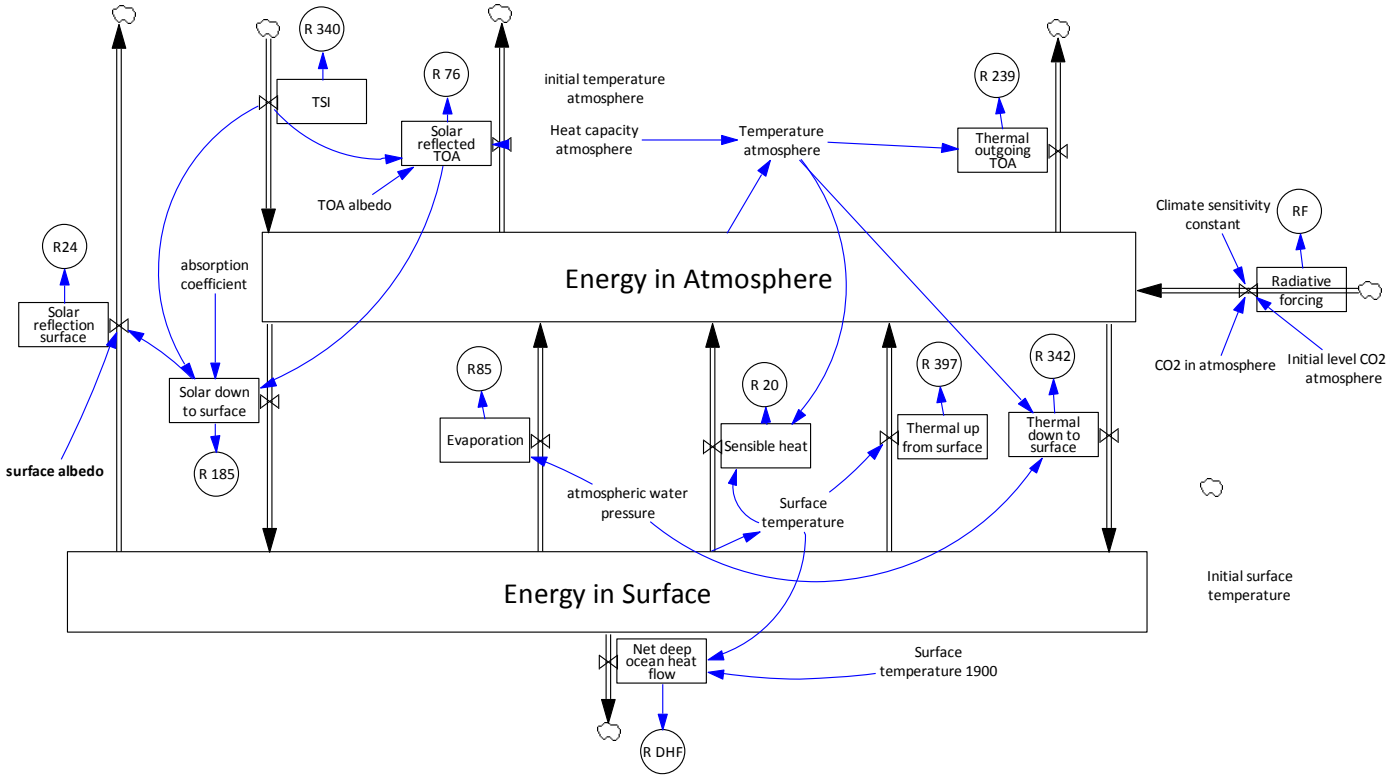
3 Experience from modeling climate change

Fred Wenstøp

Prof. Dr. Fred Wenstøp
Department chair, Department of Strategy and Logistics
Norwegian School of Management BI Nydalsveien 37, 0483 Oslo, Post address 0442 Oslo, Norway

An enormous effort is going on world-wide on modeling consequences of fossil fuel use. The effort is orchestrated by the Intergovernmental Panel on Climate Change, which is due to release their 5th report in the fall of 2013. However, a leaked version of a draft report is already available on Internet[1]. It provides a basis for a current effort at the Center for Climate Strategy at NBS led by Jørgen Randers to build a dynamic simulation model of the feedback loops involved in climate change. Although there are already a large number of climate models, only a handful uses System Dynamics as modeling tool. This presentation will discuss experiences with building a model of the earth's energy budget.

Keywords: System Dynamic Modeling; Climate Change



[1] http://wattsupwiththat.com/2012/12/13/ipcc-ar5-draft-leaked-contains-game-changing-admission-of-enhanced-solar-forcing/

4 Awareness of complex societal problems

Dorien DeTombe

Prof. Dr. Dorien DeTombe (MSc.Ph.D.)
Chair International Research Society on Methodology of Societal Complexity
P.O. Box. 3286, NL-1001 AB Amsterdam, The Netherlands, Europe
Tel: +31 20 6927526 DeTombe@nosmo.nl
www.complexitycourse.org/doriendetombe.html

A complex societal problem can be handled when it is put on a political agenda of a legitimate problem owner. Before the problem is put on such an agenda there should be an awareness of the problem, a critical mass and political will to put it on the political agenda. Many complex societal problems are not seen as a complex societal problem, and therefore not handled. These problems are often regarded as belonging to the culture of people. Sometimes only an outsider's view sees the problem. Examples are issues like virginity of women before marriage connected with the issue of family honour which sometimes leads to murder, the abortion of female foetuses in India and China connected with the low status of women, the habit of war time rape and prostitution of children, men and women. These issues are a problem for the victims, who seem not have the same human rights that other people have. The victims are regarded as 'the other'. More powerful people can use them for their own benefit. It is difficult for the victims to fight for their human rights. In the view of the human rights in Genève (1948) this injustice should be put on the political agenda.These problems should be regarded as complex societal problems. A way to handle complex societal problems can be found in the theory of the methodology for societal complexity, where the Compram methodology (DeTombe, 1994) is developed for handling these complex societal problems. This way one can, when there is a political will, analyze the problem and try to find to acceptable changes to protect these victims and increase their level of living.

Keywords: Compram Methodology; Complex Societal Problems, Awareness

5 Dialogical Paradoxes for Self-regulation in Complex Societal Systems

Marcos Estellita Lins, Lísia Maria Cabral, Angela Estellita Lins, Angela Cristina Moreira, Marcelo Poirot Land

Prof. Dr. Marcos Estellita Lins
Federal University of Rio de Janeiro
estellit@pq.cnpq.br

Traditional behavioral assumptions that support the regulatory model for complex systems comprise two main actors. On the one hand, private agents moved by limbic emotions: the fear of not having their needs met, and the desire to satisfy their unbounded ambitions. On the other hand, the regulatory agents are assumed as strictly rational, with enough power and exemption information, able to regulate social systems and prevent the excesses of private agents.
Even if the actors play their roles to perfection, various approaches regarding scientific knowledge in management and education demonstrate the importance of considering other forms of interpersonal relationship. Feldman and McPhee (2007) synthesize the four alternatives to teaching-learning developed over the last century: behaviorism, cognitivism, constructivism and humanism, which span every possibility of human relationship whatsoever.
Three paradoxical dimensions of complex systems regulation are proposed in the present work:

i) If the regulation aims at the preservation or the evolution of the system.
ii) If the regulator is located externally or internally to the system under regulation.
iii) If the perception and action on the system are localized or distributed.

These dimensions are the result of two paradoxes identified in this study as inherent to complex systems: conservative x evolutionary, external x internal (to the membrane that defines an organizational whole) and localized x distributed.
While the conservative regulation requires the mere observance of previously agreed rules to maintain the cohesion of the system, the evolutionary regulation requires mechanisms for inhibiting obstructions to evolution.
The present dominant regulatory design doesn't assign social responsibility to agents running public services. It rather assumes that external regulation can be performed through models and indicators, monitored by a bureaucratic apparatus and implemented through awards and punishment measures (stick and carrot policy). We propose here that knowledge, thinking or cognitive maps can be powerful tools to manage the dynamics of paradoxes in real world contexts and facilitate regulation of complex systems.

Keywords: Methodology, Decision, Simulation, Societal Complexity, Healthcare, Economy, Sustainable Development

6 Conversation about the Compram methodology and the field of Methodology of Societal Complexity

Stephen Taylor

Prof. Dr. S. Taylor, Computer Education
Chair Canadian research group of Methodology of Societal Complexity
Biology, Champlain Regional College, 900
Riverside Drive, J4P 3P2, Saint-Lambert, Quebec, Canada,
stevetaylorphd@hotmail.com; staylor@champlaincollege.qc.ca

Conversation on the actual state of the art of the Compram methodology and the field of Methodology of Societal Complexity. Where is the field at the moment and where is it going?

Keywords: Compram methodology, Methodology of Societal Complexity.

7 Sustainable Development and Simulation Game Modeling

Zhana Tolordava

Prof. Dr Zhana Tolordava
Tbilisi Ivane Javakhishvili State University,
Scientific Head of the University Educational and Research Center for Simulation and Interactive Methods, Georgia 0186
Avenue Vaja Pshavela YI quarter n. 18, Tbilisi, Georgia,
Tel. 955 32 230 07 40, 230 37 40
E-mail: tolordava@hotmail.com

Study of the existing concepts of sustainable development and corresponding simulation game models is necessary for making conclusions on the problem of simultaneous sustainable economic and environmental development. Sustainable development means not only non-excedance of the human impact on the environment but also adequate economic development ensuring satisfaction of the people's material wants determined by the concrete social and cultural conditions of the public life.

It is necessary to provide for management of activities directed at achieving conditions ensuring the sustainable development. This is the field where simulation game models render invaluable facilities at determining the most efficient actions for reaching the said objectives.

Sustainable development business games within our training practices use models solving the issues of the justified strategy of the acceptable options of economic activities consistent with environmental protection. It is common knowledge that in real life withdrawal from economic development due to the following principles of the environmental awareness in its extreme leads to the "zero growth" of the countries' economy. For this reason it is important to follow economic principles, or as the Russian scientist Nikita Moiseev puts it, "economic imperatives" that ensure certain level of satisfaction of material needs through economic activities (industry, services and infrastructure development), as well as satisfaction of other life values: life expectancy, education level and etc. The Noble Prize winner Amartya Sen has set forth the concept of the "Human Development", according to which the life condition requirements should include not only income levels but satisfaction of the other life values, such as the adequate lifespan and proper education and etc.
Business games used within our training practices are presented in their, so to say, "manual edition" as well as in combination of the computer generated simulation and the traditional game techniques. At the same time computer is used for implementation of the computer simulation scenarios; finding optimization management solutions and receiving expert recommendations.

Keywords: Business Game, Economy, Scenario

8 Industrial heritage as an educational polygon for development strategies

Vladimír Hain and Eva Kráľová

Vladimír Hain
PhD. Student, Slovak University of Technology in Bratislava Faculty of Architecture, Slovak Republic, European Union
Phone: +421 904 471 618
E-mail: vladimirhain@gmail.com

Prof. Dr. Eva Kráľová
Assoc. Professor, Institute of History and Theory of Architecture and Monument Restoration, Slovak
University of Technology in Bratislava Faculty of Architecture, Slovak Republic, European Union

Industrial heritage provides one of the most important records on development of cities and towns during the last two centuries. The basic purpose of the "Educational polygon" is to develop a model and operational tools, to raise the awareness of the importance of valuable buildings as a part of the cultural and technological history, to stimulate social, economic and political decisions for the purpose of protection of industrial heritage in a new creative way. Conservation of the industrial heritage is a necessary aspect of a city development and study shows example how to set up an appropriate framework for its integration within existing structure. This thesis examines the role of the architect in the processes of decision-making and care of the industrial heritage during the interventions that can have an educational character. Polygon is a tool for identifying potential industrial heritage, serving as an effective tool for communication and education in the width of the optimization process.

Keywords: OR History, OR in Education, Research and Development

9 System dynamics modelling in sustainable development of world

Lyudmila K.Kuzmina

Prof. Dr. Lyudmila K.Kuzmina
Kazan Aviation Institute
Adamuck, 4-6, Kazan-15, 420015, Russia
lyudmila.kuzmina@ksu.ru

This research is devoted to the specific problems of Mechanics Foundations and Engineering Education in High School. The actual questions are considered, that are connected with the level and quality of fundamental Knowledge on Theoretical Mechanics in training-teaching of specialists (Engineers-Mechanicians) both in general and aviation engineering domain. The principles of subject teaching are discussed, that are led to the activating and governing methods of learning in High Engineering Education. In regard to this statement the general aspects of the peculiarities, inherent to the Theoretical Mechanics subject, that are distinguishing it from another basic disciplines of Engineering Education, are studied. Also of the special difficulties in the understanding and the education, that are generated by these peculiarities, are analyzed. The objective causes, having systematic character, are selected and discovered. The general tenets are illustrated on the examples from the experience of our National Education System in the Mechanical Engineering domain [1-7]. This area is subject of deep theoretical investigation, beginning from early National Scientific-Educational Engineering Schools of Russia (Soviet Union) – S.P.Chebyshev, S.A.Chaplygin, N.E.Zhukovskiy, A.M.Lyapunov, N.G.Chetayev, A.N.Krylov …
Besides we note, this study is connected also with important trend: "System dynamics modelling in sustainable development of world in whole", *in extended sense* from view point of *nonlinear analysts* (*operations researchers*) [8-12].
Also it is very important contribution that systems thinking and system dynamics applied to complex nonlinear systems can bring for a more sustainable world, including objects of various nature of multidisciplinary character. From this point it is very interesting the development of constructive approximate asymptotic methods that are very effective for modelling nonlinear systems of general nature on the basis of the Lyapunov theory and the Chetayev stability postulate, with generalizing herewith the concepts of parametric stability and singularity Also for multidisciplinary systems this systemic techniques, based on developed here methodology, will be providing the stable solutions in dynamics for such complex systems on long-term tracks.

Keywords: Problems Perspectives Education, Theory, Applied Aspects