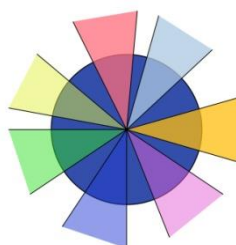


Book of Abstracts State of the Art Workshop
10th IFORS Conference on Operational Research
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Volume 29

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



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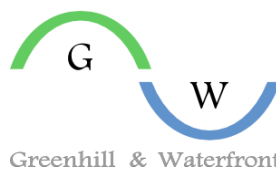
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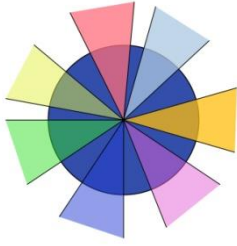
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Satellite Event State of the Art Workshop 10th IFORS 2014

The goal of the State of the Art Workshop on Societal Complexity is to give the chairs of the Euro Operational Research Working Groups EURO MSC / EURO MCDA / EUROPT / EURO ORD / Ethics and OR the opportunity to meet and discuss with each other interesting subjects concerning the latest developments in their field. The chairs are doing research in overlapping fields of societal complexity such as in ethics, decision making and developing countries.

In the State of the Art Workshop top researchers have a platform to discuss the problematic and difficult issues in their research among each other. In the half a day workshop each researcher discuss the latest development in their research field and discuss the future research questions with a special focus on problems, urgent societal issues and uncertainties.

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.

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

A workshop related to 10th IFORS conference is a co-operation of the Euro Working Groups:

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

Organized by

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Program State of the Art Workshop Barcelona 2014

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1 SOCIETAL PROCESSES IN CHINA AND CHINESE CULTURE

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Language independent nomological cognitive structures show that oriental culture is more comfortable with *objective* structures, based on the dichotomies *Yin* and *Yang*. In recent years China has been westernising, and moving towards more *subjective* thinking. In the mid-nineties Chinese scholars proposed *wuli-shili-renli*. The quest to prove that nomology is valid beyond its origins in western culture, led to over a decade of research collaborations and discussions with Chinese scholars, focusing particularly on understanding how eastern cultures approach the most challenging aspect of nomology, the *subjective/objective* dichotomy. The language independent nomological cognitive structures facilitated the comparisons. They show that oriental culture is more comfortable with *objective* structures, especially the dichotomies *Yin* and *Yang*, which form the *Ba Gua* and its eight *trigrams*, and the *Yi Jing / I Ching* and its $8 \times 8 = 64$ *hexagrams*.

Cosmological thinking in both modern Chinese discussion and ancient Confucian texts is not confined to *Yin/Yang*. Although they see *adjusting* as the norm, when some scholars look beyond their *objective* activities they see themselves as humans that “can form a trinity with Heaven and Earth” Within our *developing* system frame humans corresponds to ‘others’, Earth to ‘world’, and Heaven to ‘self’.

In recent years China has been westernising. Correspondingly, theory has been moving towards more *subjective* thinking. In the mid-nineties Chinese scholars combined their own with international methods for evaluation to propose a system based on three processes or ‘*lis*’, called *wuli-shili-renli*.

“*Wu* (objective existence), *Shi* (subjective modelling), and *Ren* (human relations) constitute a differentiated whole that conditions systems projects”. There are parallels between *adjusting* and *wuli*, *convincing* and *shili*, and *committing* and *renli*, and the systems development life-cycle.

Conflict decision processes use an *objective* structure. In a Chinese context this shows the location of the Chinese constructs *guanxi* and *mianzi*, that do not translate well into English. These are about relationships with *people*. *Guanxi* is about *personal* relationships. *Mianzi* is about relationships that relate to one’s *position*, and is usually translated as ‘face’, as in one’s image or value in the community.

Keywords: China, Culture, Nomology

2 MODERN OR FOR THE CLASSIFICATION OF SATELLITE IMAGES

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To obtain a thematic map by image classification is a challenging task in remote sensing because there exist many factors directly affecting the success of the process such as technical characteristic and quality of remotely sensed data, complexity of landscape, image processing techniques and classification scheme employed. In this talk, we would like to propose a new alternative approach to the image classification by “smartly” and “innovatively” treating these issues within the frame of nonparametric regression splines. Indeed, nonparametric regression splines offer great advantages because in real life problems and natural phenomena, many effects often exhibit nonlinear behavior. We employ *Multivariate Adaptive Regression Splines* (MARS), for the classification of MODIS (*Moderate Resolution Imaging Spectroradiometer*) images and represent the relation between the variations in the MARS model building parameters and their effect on the predictive performance. Performance of MARS in classification is compared with the traditional maximum-likelihood method based on the corresponding reference images by using error matrices (i.e., confusion matrix).

Keywords: MARS, Nonparametric regression splines, Multispectral image classification, MODIS

3 LESSONS FROM MODELING CLIMATE CHANGE WITH SYSTEM DYNAMICS

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In the face of threatening climate change caused by anthropogenous emission of CO₂, enlightened scientists ought to understand the basic dynamics that is at work. System Dynamics is an excellent tool where just a modest effort at model building can give new insights. A rather simple model of the Earth's energy budget with albedo feedback caused by melting Arctic Ocean ice and northern hemisphere spring snow cover has provided some. Among them are:

1. CO₂ plays a small, but pivotal role in global warming. Without positive feedbacks from albedo change and radiative forcing (RF) from increasing water vapor (H₂O) concentration, the effect on temperature of CO₂ would be negligible. The albedo change is soon playing out, but the RF from H₂O is uncertain and makes the future less predictable.
2. Low clouds reflect solar radiation, while high clouds reflect long wave radiation from the surface. It is very uncertain, however, how global warming will influence the clouds.
3. Solar radiation varies with the amount of sunspots, and we seem to be in for less radiation in the near future, but this will have a minor impact on global warming.
4. The effect of changing plant albedo is negligible.
5. The heat budget is currently unbalanced, with more heat coming in than going out. The difference is mainly disappearing in the deep ocean, which functions as a giant cooler.
6. Regional phenomena like volcanic eruptions and the Southern Oscillation (la Niña – el Niño) has a large, but temporary impacts on global warming, which cannot be captured by simple one-dimensional global models.

Keywords: System Dynamics; Climate Change

4 HANDLING SOCIETAL COMPLEXITY

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A new Handbook titled ‘Handling Societal Complexity: A Study of the Theory of the Methodology of Societal Complexity and the COMPRAM Methodology with Examples of Applications on Global Safety’, by Dorien J. DeTombe, is published. The book describes the theoretical development of the Field of Methodology of Societal Complexity and provides the foundation for the application of the Compram Methodology, a methodology for policy making on handling complex societal problems. The book is the magnum opus of the work of DeTombe and gives an overview of her research of the last twenty five years.

The Compram methodology can be used for handling many different kind of societal problems. In the book examples are given of the use of the Compram Methodology in the domain of Global Safety on the subject of Healthcare, Economics, Climate Change, Terrorism, Large City Problems, Large Technological Projects and Floods.

The OECD advised to created knowledge institutes based on the Compram Methodology for handling Global Safety.

The discussion will be on implementation of this approach on universities and by policy making of governments.

Keywords: Complex Societal Problems, Compram, Methodology, Policy Making

5 E-Learning for Community Health Workers in South Africa

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Modern technologies like internet and e-learning are potential tools for the improvement of professional education in the healthcare sector of developing countries. Projects addressing this issue are not only facing technical but also very complex societal challenges. The author analyses societal framework conditions and processes experienced along an e-learning project for community health workers of a charity organization in South-Africa. She draws conclusions and provides insights and lessons learnt which are relevant for healthcare related e-learning initiatives in developing countries.

