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Preface

This year the multiconference that consisted of the 2nd International Conference on Natural Resource Management (NRM '13), the 2nd International Conference on Energy Systems, Environment, Entrepreneurship and Innovation (ICESEEI '13) and the 6th International Conference on Environmental and Geological Science and Engineering (EG '13) was held in Antalya, Turkey, October 8-10, 2013. The multiconference provided a platform to discuss environment and pollution, sustainable development, water resources management, environmental engineering, pollution and monitoring, geophysics, geology and environmental systems 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 multiconference is published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as these 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

Table of Contents

Keynote Lecture 1

Energy & Environmental Problems Facing India and Turkey and their Probable Solutions

Dr. D. P. Kothari
Director General, JB Group of Institutions, Hyderabad
Former Director General, RGI, Nagpur
Former Director General, VITS Indore
Former Vice Chancellor, VIT Vellore
Former Director I/c IIT Delhi
India
E-mail: dpk0710@yahoo.com

Abstract: It briefly discusses some important energy problems facing India and Turkey and presents the current electric generation scenario in most of the developing countries with facts and figures in respect of India. It is hoped that, with systematic, advance planning, through measures like co-generation, energy management, and energy conservation, the electric energy supply scenario of AD 2020 will be free of the perennial problems of power shortages, voltage fluctuations etc.

Brief Biography of the Speaker: D.P.Kothari is, presently, Director General of J B Group of Institutions ,Hyderabad. He obtained his BE (Electrical) in 1967, ME(Power Systems) in 1969 and Ph.D in 1975 from the Birla Institute of Technology & Science(BITS) Pilani, Rajasthan. Prior to assuming charge as DG, JBI ,Hyderabad, he served as DG RGI , DG VGI, Indore, Vice Chancellor, VIT, Vellore, Director in-charge and Deputy Director (Administration) IIT Delhi as well as Head in the Centre of Energy Studies at Indian Institute of Technology, Delhi and as Principal, Visvesvaraya Regional Engineering College, Nagpur.

He was Visiting Professor at the Royal Melbourne Institute of Technology, Melbourne, Australia, during 1982-83 and 1989 for two years. He was also NSF Fellow at Purdue University, USA in 1992. He is fellow of Indian National Academy of Engineering (INAE), Indian National Science Academy (FNASc), Institution of Engineers, India (IEI) and Institute of Electrical and Electronics Engineers (FIEEE).He has authored /co-authored/more than 725 papers in International/National Journals/Conferences & 30 books including Power System Engineering, 2e Electric Machines, 4e Electric Machines (Sigma Series), 2e and Basic Electrical Engineering, 3e. His fields of specialization are Optimal Hydrothermal Scheduling, Unit Commitment, Maintenance Scheduling, Energy Conservation (loss minimization and voltage control), Power Quality and Energy System Planning and Modeling.

Keynote Lecture 2

Confirming the Power of Probabilistic Evolution Approach: A Concrete Application to Get the Analytical Solution

Professor Metin Demiralp
Istanbul Technical University
Informatics Institute
Istanbul, TURKEY
E-mail: metin.demiralp@gmail.com

Abstract: The last three years accumulated a great pile of information about the Probabilistic Evolution Approach (PEA) which is under construction in the Group for Science and Methods of Computing (Demiralp's group) studies. Until now, the skeleton and the roof of the theory has been constructed and many details, as if muscles and other organs, have also been revealed. Now we know how to convert a given set of explcit first order ordinary differential equations accompanied by appropriate initial conditions to an infinite first order, linear, homogeneous set of ordinary differential equations with a denumerably infinite constant coefficient matrix; accompanied by a denumerably infinite initial vector value imposition. We could be able also to obtain Kronecker power series solution when the descriptive function (right hand side function) vector has a conical structure. Even we could have been able to get finitely many term involving analytic results for rather specific ODE structures. However we have never intended to perform a resummation over the Kronecker power series obtained in Probabilistic Evolution Approach applications even though the issue has been reduced to kernel separability where the telescope and monocular matrices are in use.
In this presentation first we focus on simplest first order explicit ordinary differential equation and its accompanying initial condition, where the right hand side function does not depend on the independent variable (time variable in the dynamical system terminology) of the considered ODE and has a second degree polynomial structure in the unknown function of the ODE under consideration. If there are certain commutativity relations exist in the descriptive function coefficient matrices then it is possible to produce a matrix algebraic analytic structure for the solution. To this end a very recently developed approach we have called "Constancy Added Space Extension (CASE) " can be used. This extends the state space of the ODE from one dimension to two dimension and makes it possible to get pure quadraticity at the descriptive function. Then, by using certain very fruitful properties of the Kronecker products and powers, it becomes to generate an analytical solution if the coefficient matrix appearing in the quadratic structure of the descriptive function has certain symmetry conditions and also commutativity conditions. The presentation aims to focus on these issues as the time permits.

Brief Biography of the Speaker: Metin Demiralp was born in Türkiye (Turkey) on 4 May 1948. His education from elementary school to university was entirely in Turkey. He got his BS, MS degrees and PhD from the same institution, ˙Istanbul Technical University. He was originally chemical engineer, however, through theoretical chemistry, applied mathematics, and computational science years he was mostly working on methodology for computational sciences and he is continuing to do so. He has a group (Group for Science and Methods of Computing) in Informatics Institute of ˙Istanbul Technical University (he is the founder of this institute). He collaborated with the Prof. Herschel A. Rabitz's group at Princeton University (NJ, USA) at summer and winter semester breaks during the period 1985-2003 after his 14 month long postdoctoral visit to the same group in 1979-1980. He was also (and still is) in collaboration with a neuroscience group at the Psychology Department in the University of Michigan at Ann Arbour in last three years (with certain publications in journals and proceedings).
Metin Demiralp has more than 100 papers in well known and prestigious scientific journals, and, more than 230 contributions together with various keynote, plenary, and, tutorial talks to the proceedings of various international conferences. He gave many invited talks in various prestigious scientific meetings and academic institutions. He has a good scientific reputation in his country and he was one of the principal members of Turkish Academy of Sciences since 1994. He has resigned on June 2012 because of the governmental decree changing the structure of the academy and putting politicial influence possibility by bringing a member assignation system. Metin Demiralp is also a member of European Mathematical Society. He has also two important awards of turkish scientific establishments.
The important recent foci in research areas of Metin Demiralp can be roughly listed as follows: Probabilistic Evolution Method in Explicit ODE Solutions and in Quantum and Liouville Mechanics, Fluctuation Expansions in Matrix Representations, High Dimensional Model Representations, Space Extension Methods, Data Processing via

Multivariate Analytical Tools, Multivariate Numerical Integration via New Efficient Approaches, Matrix Decompositions, Multiway Array Decompositions, Enhanced Multivariate Product Representations, Quantum Optimal Control.

Plenary Lecture 1

Assessment of Risk Factors of Environment Pollution Caused by Accidental Oil Spilling on the Base of Mathematical Modelling

Professor Teimuraz Davitashvili
I. Vekua Institute of Applied Mathematics
Tbilisi State University
&
Georgian Hydro-Meteorological Institute
GEORGIA
E-mail: temuri.davitashvili@viam.sci.tsu.ge

Abstract: Pollution of the environment by solid, liquid and gas contaminants of artificial origin have been in the center of heightened attention of scientists for several decades and represents one of the most important problems of the contemporary science. Putting this problem forward is conditioned by the fact that most contaminants have a harmful effect on the health of living organisms, on the hygiene of the biosphere and on the regional and global climate alteration which represents one of the main problems of present days. The oil spillage caused by oil transportation by pipeline and railway results in serious deterioration of environment. Namely in the result of accidental spilling the oil can be spreading over the dry surface, it can cover the holes and depressions, it may be found in river through the peculiarities of relief and afterwards it can be transported into the seawater. As rule, the oil spilling, spreading and flowing over the dry surface is following by the oil penetration in subsoil. If this phenomenon proceeds intensively, then it may be happened to revealed oil in groundwater and it may be transported by groundwater flows. All these processes have very seriously impact on environment, and therefore, on human health. So it is very important to carry out preventive model studies of possible emergency situations.
In this article distribution of petroleum and mineral oil into the soils in case of their emergency spilling on the flat surface containing pits is studied and analyzed. The behaviors of the infiltration process and diffusion parameters are studied. Also spreading of the spilled oil in the Georgian Black Sea coastal zone on the basis of a 2-D numerical model of oil distribution in the seawaters is simulated. Some results of numerical experiments are presented. Numerical experiments were carried out for different hypothetical sources of pollution in case of different sea circulation regimes dominated for the four seasons in the Georgian Black Sea coastal zone. Results of calculations have shown that risk of surface and subsurface waters pollution owing to oil emergency spilling is high.

Brief Biography of the Speaker: Prof. Teimuraz Davitashvili holds a 5-year Diploma in Mathematics (specialization Hydro-air Mechanics) from Tbilisi State University (1972). In 1985 he received the Ph.D and in 1997 the Doctor of Physics and Mathematics upon the doctoral thesis " Numerical Modelling of Some Problems of Atmosphere Physics for Mountain Regions". Since 1972- researcher, senior researcher, head of department and currently head of laboratory of Mathematical Modelling and Numerical Analyses at I.Vekua Institute of Applied Mathematics of Tbilisi State University. From 1994 to 1998 an Associate Professor and from 1999 to 2006 a Full Professor of Tbilisi State University. Since 2006- head of department of Weather Forecast and Modelling of Natural and Anthropogenic Catastrophic Events at the Hydrometeorological Institute of Georgia. He published 1 book, about 130 research papers in various scientific journals and international conference proceedings. His general research interests are: applied mathematics, computational simulation of non-ordinary events, numerical modeling of environmental pollution and weather forecast by numerical methods.
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Plenary Lecture 2

Scenario of Renewable Energy in Malaysia

Professor Azami Zaharim
Head of Project Group of Renewable Energy Resources Analysis,
Policy & Energy Management, Renewable Energy Niche and
Head Centre for Engineering Education Research
Faculty of Engineering and Built Environment
Universiti Kebangsaan Malaysia
MALAYSIA
E-mail: azami.zaharim@gmail.com

Abstract: For decades, fossil fuels has become the solely sources of energy to the entire world. Unfortunately, the problems associated with fossil fuels have awakened nations to convert to new renewable and sustainable sources. Present energy consumption scenario and alternative energy resources in Malaysia have been discussed in this paper. As a developing towards industrial country, stability of primer energy sources and ability to minimize the environmental impact should be considered. The existing renewable energy sources such as solar, wind and biomass should be explored and fully utilized in such a way for sustainable development.

Brief Biography of the Speaker: Azami Zaharim worked first 13 years as a lecturer in the Universiti Teknologi MARA (University of MARA Technology - UiTM) before joining the Universiti Kebangsaan Malaysia (National University of Malaysia - UKM) in the year 2003. He obtained his BSc(Statistics and Computing) with Honours from North London University, UK in 1988 and PhD (Statistics) in 1996 from University of Newcastle Upon Tyne, UK. He specialize in statistics, public opinion, engineering education and renewable energy resources. In the year 2007, he headed the Engineering Mathematics Research Group. At the same time, he is currently active involve in outcome based education (OBE) approach at the national level and the chairman of the Engineering Education Research Group since 2005. He is also involved actively in the research for the future of engineering education in Malaysia 2006 under the Ministry of Higher Education of Malaysia. He is currently Head of Project Group of Renewable Energy Resources Analysis, Policy & Energy Management, Renewable Energy Nicheand also Head of Centre for Engineering Education Research.He has until now published over 80 research papers in Journals and conferences, conducted more than 15 public opinion consultancies and delivered 4 keynotes/invited speeches at national and international meetings.

Plenary Lecture 3

Experimental Studies on Building Integrated Photovoltaic Thermal Collectors with Different Absorber Design

Professor Kamaruzzaman Sopian
Solar Energy Research Institute
Universiti Kebangsaan Malaysia
MALAYSIA
E-mail: ksopian@eng.ukm.my

Abstract: The performance of building integrated photovoltaic thermal (BIPVT) collectors were determined by the PVT efficiency and primary-energy saving efficiency of the three collectors. The first collector, known as Serpentine flow absorber, the second collector, known as Oscillatory flow absorber, the third collector known as Parallel-serpentine flow absorber. In this study, it is assumed that the absorber collectors were attached underneath the flat plate single glazing sheet of polycrystalline silicon photovoltaic module and water has been used as a heat transfer medium in absorber collectors. The testing has been performed for the BIPVT collector under solar radiations at 800 W/m2. The various mass flow rates were introduced and ranging from 0.011 kg/s to 0.041 kg/s. The analysis on the BIPVT collectors have been segregated into three sections comprised of PV efficiency, thermal efficiency and combination of both (PVT efficiency). The results show that Parallel-serpentine flow absorber gave the highest efficiency at mass flow rate of 0.041 kg/s. It produced PVT efficiency about 65% with 13% PV efficiency and of 52% thermal efficiency, also it produced primary-energy saving efficiency from about 76% to 86% at the mass flow rate from 0.011 kg/s to 0.041 kg/s.

Brief Biography of the Speaker: Prof. Dr. Kamaruzzaman Bin Sopian obtained his BSc in Mechanical Engineering from the University of Wisconsin-Madison in 1985, MSc in Energy Resources from the University of Pittsburgh in 1989 and PhD. in Mechanical Engineering from the Dorgan Solar Laboratory, University of Miami in 1997. He is presently the Professor in Renewable Energy at the Department of Mechanical and Material Engineering, UniversitiKebangsaan Malaysia. Currently, he is the Director of the Solar Energy Research Institute, a center of excellence for the research and development in solar energy technology. He has been involved in the field of solar energy for more than twenty years. His main contributions are in solar radiation modeling, alternative material for solar absorber, solar water heating system with integrated storage system, solar desalination, solar cooling, daylighting using solar light pipes, solar assisted drying systems, grid-connected photovoltaic system, thin film silicon solar cells, combined photovoltaic thermal or hybrid collector and solar hydrogen production system. He has published over 400 research papers in journals and conferences. He has delivered keynotes speeches at national and international conferences on renewable energy. He is the founding member of the Malaysian Institute of Energy, member of the World Renewable Energy Network based in the United Kingdom and is an associate editor of the Renewable Energy and Sustainable Cities and Society published by Elsevier Ltd. He heads several national subcommittees on renewable energy by the Malaysian government to promote awareness, market enhancement, policy studies and the applications renewable energy.