

Editors: Vincenzo Niola, Michel Kadoch, Alexander Zemliak

MODELS AND METHODS IN APPLIED SCIENCES

**Proceedings of the 2nd International Conference on
Environment, Economics, Energy, Devices, Systems,
Communications, Computers, Mathematics (EDSCM '12)**

Saint Malo & Mont Saint-Michel, France, April 2-4, 2012

ISBN: 978-1-61804-082-4



MODELS AND METHODS IN APPLIED SCIENCES



MODELS and METHODS in APPLIED SCIENCES

**Proceedings of the 2nd International Conference on Environment,
Economics, Energy, Devices, Systems, Communications, Computers,
Mathematics (EDSCM '12)**

**Saint Malo & Mont Saint-Michel, France
April 2-4, 2012**

MODELS and METHODS in APPLIED SCIENCES

**Proceedings of the 2nd International Conference on Environment,
Economics, Energy, Devices, Systems, Communications, Computers,
Mathematics (EDSCM '12)**

**Saint Malo & Mont Saint-Michel, France
April 2-4, 2012**

Published by WSEAS Press
www.wseas.org

Copyright © 2012, by WSEAS Press

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: <http://www.worldses.org/review/index.html>

ISBN: 978-1-61804-082-4



International Authority for the Advancement of Science and Applications of Technology

MODELS and METHODS in APPLIED SCIENCES

**Proceedings of the 2nd International Conference on Environment,
Economics, Energy, Devices, Systems, Communications, Computers,
Mathematics (EDSCM '12)**

**Saint Malo & Mont Saint-Michel, France
April 2-4, 2012**

Editors:

Prof. Vincenzo Niola, University of Naples "Federico II", Italy

Prof. Michel Kadoch, University of Quebec, Canada

Prof. Alexander Zemliak, Autonomous University of Puebla, Mexico

International Program Committee Members:

Lotfi Zadeh, USA

Tadeusz Kaczorek, POLAND

Leon Chua, USA

Metin Demiralp, TURKEY

Zoran Bojkovic, SERBIA

Aida Bulucea, ROMANIA

Valeri Mladenov, BULGARIA

Fragiskos Topalis, GREECE

Dimitris Bertsekas, USA

Jose Antonio Porfirio, PORTUGAL

Catalin Popescu, ROMANIA

Laura Mariana Cismas, ROMANIA

Saurabh Kwatra, RUSSIA

Arun Goel, INDIA

Yu Zhang, USA

Anjali Srivastava, INDIA

Robert Bata, CZECH REPUBLIC

Yap Yee Jiun, MALAYSIA

Olga Martin, ROMANIA

Rakesh Verma

Yilun Shang

Mahdi Faraji

Lungu Mihai Aureliu

Radek Matusu

Montri Phothisonothai

P.Palanivel

Vipul Arvindbhai Shah

Kok Mun Ng

Tiberiu Socaciu

José Ignacio Hernández López

Carlos Manuel Travieso-González

Carla Pinto

Guido Izuta

Yixin Bao

Andrey Dmitriev

Heimo Walter

Emre Kiyak

Sorin Gherghinescu

Ala Hamarsheh

Sudhir Sudhir Dawra

Jiri Hosek

Miroslav Voznak

El Oualkadi Ahmed

Amirhossein Fereidounbar

Roxana-Mariana Zoican

Popescu Constantin

Shady Hamdy Farahat

Mirela-Catrinel Voicu

Ionel Botef

Andrea Piras

Maulahikmah Galinium

Sudhir Dawra

Waqas Bangyal

Mrityunjay Kumar Ray

Selvakumar G

Santoso Wibowo

Tomasz Dlugosz

Pravoslav Martinek

Hamed Ziaepoor

Nitish Gupta

Saw Chin Tan

Abdel-Rahman Al-Qawasmi

Mazin Al Hadidi

Sandra Sendra

Tseng Hsien-Wei

Arianit Maraj

Mohd Helmy Abd Wahab

Saravanan Kumarasamy

Sawtantar Singh Khurmi

Jan Ochodnický

Sorinel Oprisan

Additional Reviewers:

N. Mahendran Nagalingam

Mohamed Zahran

Chandrasekaran Manoharan

Alina Badulescu

Elaine Inacio Bueno

Chirita Mioara

Yang Zhang

Md. Haider Ali Biswas

Vivek Sunnapwar

Ankit Patel

Cristian Foscau

Neha Srivastava

Zengshi Chen

Alejandro Fuentes-Penna

Jose Flores

Yu Zhang

Yuqing Zhou

Takuya Yamano

Panagiotis Gioannis

Wan Hussain Wan Ishak

Libor Pekar

Dinko Vukadinovic

Hsin-Jang Shieh

Andrzej Zak

Chenwen Zheng

Kostantinos Kalovrektis

Hime Aguiar

Belkheiri Mohammed

Mihaela Iliescu

Konstantin Volkov

Elena Scutelniciu

Alexander N. Pisarchik
Calin Ciufudean
Shaikh Abdul Hannan
Babak Khalili Hadad
Khin Wee Lai
Valentina E. Balas
Klimis Ntalianis
Harjit Pal Singh
Mihai Timis
Gnanasekar P
Muddassir Iqbal
Mohammad Al-Amri
Bagavathi Nagarajan
Thaweesak Yingthawornsuk
Vimala Chinnaraj
Alexandru Ogorescu
Muhammad Zakarya
Marius Marcu
Kamel Hussein Rahouma
Rajib Kar
Baburao Kodavati
Lai Khin Wee
Sangeetha Rajendran
Manjunath Kn
Yi-Chao Wu
Huey Voon Chen
Sunitha Kvn
Fernando Reinaldo Ribeiro
Christian Von Lucken
Andrei Jean Vasile
Ming-Shen Jian
Claudia - Georgeta Carstea
Larion Alin
Zakaria Zubi
Vijay Kumar G
Mueen Uddin Awan
Gabriella Bognar
Turek Rahoveanu
Petr Hajek
Ricardo Bustillo
Saheeb Ahmed Kayani
Harry Coomar Shumsher Rughooputh
Yin-Tsuo Huang
Ana Cristina Vicente Dinis Pardal
Cristina Barbu
Mir Mohammad Alavi Nikje
Pavel Varacha
Angel F Tenorio
Dana Anderson
Krisztina Uzuneanu
Lester Ingber
Satya Shah
Socrates Basbas
Humberto Varum
Iuliana Oana Mihai
Balcu Florina
Corina Sbughea

Paulo Avila
Elamin Ali
Sk. Sarif Hassan

Table of Contents

<u>Plenary Lecture 1: Design and Performance Evaluation of Solar Assisted Chemical Heat Pump Dryer</u>	10
<i>Kamaruzzaman Sopian</i>	
<u>A New Heuristic Technique Applied to Optimal Location of SVC & TCSC</u>	11
<i>H. Iranmanesh, M. Rashidi Nejad</i>	
<u>Quadratic Control for a Jump Linear System with Unknown Coefficients</u>	17
<i>Adam Czornik, Aleksander Nawrat</i>	
<u>An Experimental Study of Kit Fuel Cell Car to Supply Power</u>	22
<i>Mustafa I. Fadhel</i>	
<u>Hydrogenated Amorphous Silicon Thin Film Solar Cell on Stainless Steel</u>	27
<i>Seung Jae Moon, Beom Jun Kim, Chang Min Keum, Byung Seong Bae</i>	
<u>Complete Decompositions of some Finite Groups</u>	30
<i>H. V. Chen, A. Y. M. Chin</i>	
<u>The Rural Development: One of the Most Important Challenges for Romania</u>	33
<i>Andreea Drăgoi, Neculai Cristina</i>	
<u>Drop Segments Function in 2D Dimensions</u>	39
<i>Claude Ziad Bayeh, Nikos E. Mastorakis</i>	
<u>Environmental Process Based Education and Research for Better Life and Enactment of International Environmental Impact Laws – 2012</u>	44
<i>Vijayan Gurumurthy Iyer, Nikos E. Mastorakis</i>	
<u>Industrial Landfill Sources of Air, Water and Land Pollution in India</u>	57
<i>Vijayan Gurumurthy Iyer, Nikos E. Mastorakis</i>	
<u>Ecological Impact Assessment for Prediction and Assessment of Impacts on the Biological Environment with Respect to the Indian Scenerio</u>	61
<i>Vijayan Gurumurthy Iyer, Nikos E. Mastorakis</i>	
<u>Monitoring, Measurement and Control Opportunities of Food Contaminants Through Process Approach</u>	67
<i>Vijayan Gurumurthy Iyer, Nikos E. Mastorakis</i>	
<u>Grouping the Romanian Rural Areas after the Economic Dimensions of Quality of Life at NUTS 3 Level</u>	77
<i>Neculai Cristina, Andreea Drăgoi</i>	
<u>An Application of Dynamic Optimization in Economics</u>	83
<i>R. Cervello-Royo, J.-C. Cortes, R. Villanueva, R. Shoucri</i>	
<u>Attractive Product in Mathematics</u>	86
<i>Claude Ziad Bayeh, Nikos E. Mastorakis</i>	

<u>Data Envelopment Analysis (DEA) Evaluation Framework of Hotel Services</u>	91
<i>N. A. Deraman, J. M. Said, F. I. Saman, S. Shafie, N. R. Paujah Ismail</i>	
<u>Pawn Series Numbers and Spiral Table</u>	97
<i>Claude Ziad Bayeh, Nikos E.Mastorakis</i>	
<u>Environment and Sustainable Development, Coordinate of the Planetary Security</u>	104
<i>Aelenei Victor, Chirila Mihai, Cavaropol Dan Victor</i>	
<u>Environmental Risk Caused by Dangerous Substances and Hazmat Crimes - A Case Study for Romania</u>	109
<i>Dan Victor Cavaropol, Victor Aelenei, Mihai Chirila</i>	
<u>Sustainable Development of Security Dimensions</u>	113
<i>Aelenei Victor, Cavaropol Dan Victor, Chirila Mihai</i>	
<u>Design and Performance Evaluation of Solar Assisted Chemical Heat Pump Dryer</u>	118
<i>K. Sopian, M. I. Fadhel, W. R. W. Daud, M. A. Alghoul, A. Zaharim</i>	
<u>Development of Diffused Solar Radiation Maps using GIS Software for Malaysia</u>	124
<i>A. W. Azhari, M. A. Alghoul, S. H. Zaidi, A. H. Ibrahim, J. M. Abdulateef, A. Zaharim, K. Sopian</i>	
<u>Mathematical Modeling for the Drying Characteristics of Seaweed Gracilaria Cangii in a Solar Dryer</u>	129
<i>Ahmad Fudholi, M. H. Ruslan, M. A. Alghoul, M. Y. Othman, A. Zaharim, K. Sopian</i>	
<u>Economic Analysis of Solar Assisted Chemical Heat Pump Dryer</u>	134
<i>M. I. Fadhel, W. R. W. Daud, M. A. Alghoul, A. Zaharim, K. Sopian</i>	
<u>Potential of Renewable System Powering a Mosque in Libya</u>	139
<i>Alsharif Mustafa, M. A. Alghoul, Nilofar Asim, Kh. Glaiza, Kh. Abulqasem, M. N. Mohammed, A. Zaharim, K. Sopian</i>	
<u>Spectral Transmittance Under Cloudless Sky Over Bangi-Malaysia</u>	145
<i>Yousef A. Eltbaakh, M. H. Ruslan, M. A. Alghoul, M. Y. Othman, M. I. Fadhel, A. Zaharim, K. Sopian</i>	
<u>Problems Regarding the Endurance of Boilers when using Straw from North-Eastern Region of Romania</u>	152
<i>L. Mihaescu, G. Lazaroiu, T. Prisecaru, I. Pisa, E. Pop, V. Berbece, G. P. Negreanu</i>	
<u>A Numerical Analysis for the Performance Improvement of a Channel Heat Exchanger</u>	158
<i>Byung-Hyun Jang, Byeong-Ha Jeon, Kwon-Hee Lee</i>	
<u>Second Law Thermodynamic Analysis of a Solar Single-Stage Absorption Refrigeration System</u>	163
<i>J. M. Abdulateef, M. A. Alghoul, Ranj Sirwan, A. Zaharim, K. Sopian</i>	
<u>Synthesis and Characterization of Aluminum Matrix Composites Reinforced with Various Ratio of TiC for Light Devices</u>	169
<i>Malek Ali, M. I. Fadhel, M. A. Alghoul, A. Zaharim, K. Sopian</i>	
<u>Peak-Period Models and 24-Hour Models Comparison</u>	175
<i>Zdeněk Říha, Jan Dytrych</i>	

<u>Environmental Kuznets Curve in Road Transport</u> <i>Zdeněk Říha, Marek Honců</i>	180
<u>Optimal Insurance Contracts under Moral Hazard</u> <i>Daniela-Viviana Raileanu, Mihai Daniel Roman</i>	183
<u>The Portfolio Management of Pension Funds Faced with the Crisis' Challenges</u> <i>Dan Constantinescu, Ciprian Antoniadă Alexandru</i>	189
<u>Efficient Embedding for Audio Steganography</u> <i>Mazdak Zamani, Azizah Bt Abdul Manaf, Shahidan M. Abdullah</i>	195
<u>The Multi-Meta Model Aimed for Schema Reuse in Conceptual Database Design</u> <i>Mirta Baranović, Slaven Zakošek, Damir Kalpić</i>	200
<u>The Impact of Monetary Policy on Stock Prices in Eastern European Markets</u> <i>Ovidiu Stoica, Delia-Elena Diaconasu, Anca Elena Nucu</i>	206
<u>Public Debt Policy in Romania – A Critical Review</u> <i>Florin Oprea, Irina Bilan, Ovidiu Stoica</i>	212
<u>Half Circular Vector in 2D Space</u> <i>Claude Ziad Bayeh, Nikos E.Mastorakis</i>	218
<u>Failure Analysis Capabilities for PV Systems</u> <i>Florin Ancuta, Costin Cepisca</i>	224
<u>The Human Capital – Foundation National System of Innovation in the Innovative Economy</u> <i>Mirela Stoican, Adina Liana Camarda, Mihai Mares, Culai Dascălu, Nelly Filip, Lina Vlăsceanu</i>	230
<u>Drying Kinetics of Malaysian Canarium Odontophyllum (Dabai) Fruit</u> <i>Dayang Fredalina Basri, Ahmad Fudholi, M. H. Ruslan, M. A. Alghoul</i>	236
<u>Multimedia Standard in UGC</u> <i>Maria Ilaria Lunesu, Giulio Concas</i>	242
<u>Authors Index</u>	247

Plenary Lecture 1

Design and Performance Evaluation of Solar Assisted Chemical Heat Pump Dryer



Professor Kamaruzzaman Sopian

Solar Energy Research Institute
Universiti Kebangsaan Malaysia
43600 UKM Bangi Selangor
MALAYSIA

Email: ksopian@eng.ukm.my

Abstract: The aim of this study to present the experimental performance of solar assisted chemical heat pump dryer. The results for typical sunny day were presented. The drying curves are formed by the measurement of the material moisture content as a function of time under constant drying air conditions. The temperature 55°C and two air drying speed (1m/s, and 3m/s) has been investigated. The weight was recorded on personal computer at 5 minutes intervals, and about 65g of fresh lemongrass was used in each run. The lemongrass was dried from average initial moisture content of 85% wb to an average final moisture content of 13% wb. The maximum value of solar fraction of 0.713 and the maximum value of coefficient of performance of chemical heat pump (coph) of 2 were obtained from experiment at sunny day. The total system energy output from the experiment at sunny day was 51 kWh. The results show that any reduction of energy at condenser as a result of a decrease in solar radiation will decrease the coefficient of performance as well as decrease the efficiency of drying.

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, Universiti Kebangsaan 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 keynote 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..