

Editor : Herman Mawengkang
Tulus
Saib Suwilo
Marwan Ramli

Gerhard Wilhelm Weber
Gerhard Wäscher
Elise del Rosario

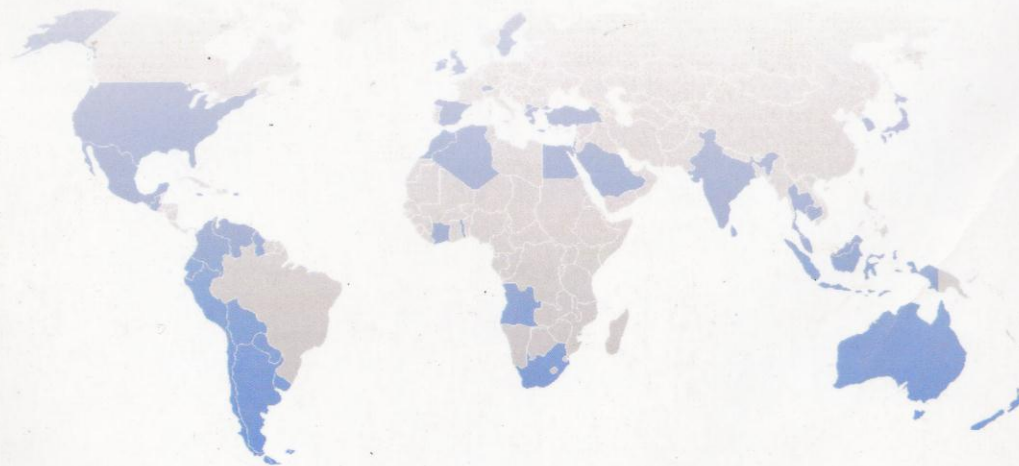
PROCEEDING of **INTERiOR** 2013



The 2nd International Seminar on Operational Research

OR for Industry, Environment and Society

*August 26th - 27th, 2013
Santika Dyandra Hotel, Medan
Indonesia*



Organized by:



Department of Mathematics
Faculty of Mathematics and Natural Sciences
University of Sumatera Utara

Supported by:



Proceeding

The 2nd International Seminar on Operational Research

(InteriOR 2013)

OR for industry, Environment and Society

Editor:

Herman Mawengkang

Tulus

Saib Suwilo

Marwan Ramli

Gerhard Wilhelm Weber

Gerhard Wäscher

Elise del Rosario



Department of Mathematics
Faculty of Mathematics and Natural Sciences
University of Sumatera Utara

Proceeding
The 2nd International Seminar on Operational Research

Editor:

Herman Mawengkang

Tulus

Saib Suwilo

Marwan Ramli

Gerhard Wilhelm Weber

Gerhard Wäscher

Elise del Rosario

Copyright © 2013, to the authors

All right reserved

Cover designed by:

Muhammad Romi Syahputra

Published by:



Department of Mathematics
Faculty of Mathematics and Natural Sciences
University of Sumatera Utara

ISBN: 978-602-19937-1-2

Message from The 2nd InteriOR Chairman

On behalf of the organizing committee, it is my great pleasure to welcome all participants of The 2nd International Seminar on Operational Research (INTERiOR 2013).

In a nutshell, Operational In a nutshell, operational research (O.R.) is the discipline of applying appropriate analytical methods to help make better decisions. By using techniques such as problem structuring methods (sometimes known as 'Soft O.R.') and mathematical modeling to analyze complex situations, operational research gives executives the power to make more effective decisions and build more productive systems based on: *more complete data, consideration of all available options, careful predictions of outcomes and estimates of risk, the latest decision tools and techniques*

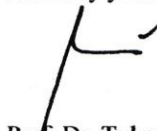
To achieve these results, O.R. professionals draw upon the latest analytical technologies, including:

- **Simulation**, giving you the ability to try out approaches and test ideas for improvement.
- **Optimization**, narrowing your choices to the very best when there are virtually innumerable feasible options and comparing them is difficult.
- **Probability and Statistics**, helping you measure risk, mine data to find valuable connections and insights, test conclusions, and make reliable forecasts.

The objectives of the seminar are to provide a forum for researches, lecturers, educators and students to exchange ideas, to communicate and discuss research findings and new advances in mathematics, especially in operational research.

Lastly, I would like to thank the Organizing Committee for their hard work in making this event successful. To all participants, I wish you to have fruitful interactions with your peers, and to our foreign friends too.

Thank you.
Sincerely yours,



Prof. Dr. Tulus, M.Si
Chairman of Interior 2013

Organizing Committee

International Scientific Committee

Prof. Dr. Gerhard'escher	President Elect of EURO, University of Magdeburg, <i>Germany</i>
Prof. Dr. Gerhard Wilhelm Weber	Middle East Technical University, Ankara, <i>Turkey</i>
Prof. Dr. Masaji Watanabe	Okayama University, <i>Japan</i>
Prof. Dr. Edy Tri Baskoro	Institut Teknologi Bandung, <i>Indonesia</i>
Prof. Dr. Sudrajat Supian	Padjajaran University, <i>Indonesia</i>
Prof. Dr. Ismail Bin Mohd	Universiti Malaysia Terengganu, <i>Malaysia</i>
Associate Prof. Anton Abdulbasah kamil	Universiti Sains Malaysia, <i>Malaysia</i>
Dr. P. Vasant	University Technology Petronas, <i>Malaysia</i>
Associate Prof. Adam Baharum	Universiti Sains Malaysia, <i>Malaysia</i>
Prof. Dr. Herman Mawengkang	University of Sumatera Utara, <i>Indonesia</i>
Prof. Dr. Muhammad Zarlis	University of Sumatera Utara, <i>Indonesia</i>
Prof. Dr. Opim Salim Sitompul	University of Sumatera Utara, <i>Indonesia</i>
Prof. Dr. Tulus, M.Si	University of Sumatera Utara, <i>Indonesia</i>
Prof. Dr. Saib Suwilo, M.Sc	University of Sumatera Utara, <i>Indonesia</i>
Dr. Sutarman, M.Sc	University of Sumatera Utara, <i>Indonesia</i>
Dr. M.D.H. Gamal	University of Riau, <i>Indonesia</i>
Dr. Marwan Ramli, M.Si	Syiah Kuala University, <i>Indonesia</i>

Local Organizing Committee

Chairman: Prof. Dr. Tulus, M.Si

Members:

Dr. Marwan Ramli, M.Si	Dhia Octariani, M.Si
Dr. Syahril Efendi, S.Si., MIT	Isnaini Halimah Rambe, M.Si
Sajadin Sembiring, S.Si., M.Sc.Com	Syahriol Sitorus, S.Si., MIT
Dr. Mardiningsih, M.Si	Fadly Sahputra, M.Sc.Com
Maya Silvi Lydia, M.Sc	Dr. Ariswoyo, M.Si
Dr. Elly Rosmaini, M.Si	Dr. Faigiziduhu. Buulolo, M.Si
Dr. Firmansyah, M.Si	Romi Fadillah Rahmat, M.Sc.Com
Drs. Sawaluddin Nasution, MIT	Muhammad Fadly Sani, S.Kom
Muhammad Romi Syahputra, M.Si	Artanta Sinulingga, S.T
Aghni Syahmarani, M.Si	Subandi
Rina Widyasari, M.Si	Sutrisno