



19th International Conference on Multiple Criteria Decision Making

MCDM for Sustainable Energy and Transportation Systems

7th – 12th January 2008

The University of Auckland, Auckland, New Zealand

Programme and Abstract Book



Contents

Message from the Chair of the Organising Committee.....	ii
Committees.....	iii
Conference Venue.....	iv
Social Programme.....	v
Programme Overview.....	vi
Scientific Programme.....	vii
Abstracts.....	1
Author Index.....	197

Message from the Chair of the Organising Committee

Dear colleagues

On behalf of the organising committee I welcome you to the 19th International Conference on Multiple Criteria Decision Making in Auckland, New Zealand. In 1975 the first meeting was organised by Herve Thieriez and Stanley Zionts in Jouy-en-Josas, France. In an approximately two-year cycle the conference has toured the world, usually alternating between Europe and overseas. I am especially proud that Auckland has been chosen as only the second location in the southern hemisphere, after the excellent conference organised by Theo Stewart in Cape Town in 1997.

The theme of the 19th meeting is "MCDM for Sustainable Energy and Transportation Systems". In the globalised economy of the 21st century the world has entered an age of exponentially increasing demand for energy and transportation services. Climate change and other environmental impacts of human economic activity necessitate the consideration of conflicting goals in decision making processes to develop sustainable systems. Multiple criteria decision making has a lot to offer in addressing this need.

The conference programme reflects that theme with many talks relating to applications of MCDM in sustainable development, transportation and energy systems, management of natural resources etc. However, you will also find papers on MCDM theory and methodology, applications in many other areas and interdisciplinary topics. I hope that you will all find the scientific programme stimulating and wish you fruitful discussions throughout the week.

The scientific programme is organised in 47 sessions, including two invited plenary talks by Prof. Anna Nagurney and Prof. Jim Petrie, the MCDM award plenary talks (the winners of the MCDM Gold Medal, Edgeworth-Pareto Award and the Georg Cantor award will be announced at the conference dinner), an opening session and the MCDM Society business meeting, to which all participants are invited. The contributed papers are organised in 42 parallel sessions (with only 3 talks in parallel to enable you to attend as many talks as possible).

You will also enjoy the social programme with a Powhiri and visit to Auckland Museum including a Maori performance that will let you experience the culture of the indigenous people of Aotearoa New Zealand. A ferry ride will take us across Waitemata harbour to Waiheke Island for the conference dinner at a winery on a hilltop offering marvellous views to the city.

I wish you all a pleasant and rewarding stay at Auckland.

Matthias Ehrgott

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Multiple Criteria Decision Support for Heating Systems in City Electro Transportation

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ABSTRACT

In this paper provision of optimal level of climate parameters in passengers' interior of public electro transportation by providing minimal electro energy consumption is looked over as the task of control optimization of mechatronic system. This task can be realized using artificial intellect and progressive multiple criteria decision making methods.

Popular Nelder-Mead multiple criteria decision making method will be applied in the article which gives a possibility to search for minimal value of some target function. In this case it is minimal electro energy consumption dependence on maximal comfort level.

The modeling and investigation are based on the typical architecture of heating ventilation and air condition system with a traditional application of AC induction motors for driving both compressor and fan of the conditioner. The well-known field-oriented method has been considered for the modeling.

A special interest for investigations and further development is devoted to intelligent heating systems allowing more flexible regulation of the system's compressor and fan operation, and, therefore, improvement of efficiency and energy saving. It is very important to gather information about all environmental and heating system variable parameters and their mutual interaction in the result of which it is possible to create a control system model and to make prognosis on its work.

Heat energy educed during moving process of electro transportation - power engine, brake resistors, control system, which usually is uselessly discharged into nature, takes an important place when saving electro energy. It is possible to collect this energy and to shift for heating needs of passengers' interior; wherewith electro energy consumption of heating system is reduced. When performing this kind of heat energy connection to heating systems, intellectual process control which is able to track fluctuations of heat energy and to make fast balancing of them from different sources has an important role. At the end of the article several conclusions are given.

Keywords: multiple criteria decision making, fuzzy logic, heating system, climate control, energy saving

Author Index

Abbas, A E	158	Corner, J	25
Akhisar, I	182	Cortina, C	166
Aktas, E	184	Cui, X Y	172
Al-Arfaj, K	161	Dahal, K	161
Arenas-Parra, M	171	Daniel, J	49
Arora, H	25	Davies, J	138
Ashbolt, N J	110	Deb, K	63, 143, 154
Bader, J	154	Deha Er, I	50, 115, 179
Baeck, T	153	Delorme, X	193
Balckars, P	6, 92	Deng, H	114
Bana e Costa, C A	134	DeSmet, Y	100
Barfod, M B	149	Deutz, A	13, 153
Beck, J	164	Dhillon, G	70
Beinarts, I	125	Diaz-Balteiro, L	83
Belton, V	123, 138	Doerner, K F	121
Bensely, A	49	Dooley, E	180
Beullens, P	82	Duarte, A R	58
Bieda, B	3	Ehrgott, M	7, 9, 12, 15, 87
Bilbao-Terol, A	171	Elaoud, S	120
Bisdorff, R	79	Emmerich, M	13, 153
Bleuler, S	152	Fan, L	71
Boggia, A	166	Fernandez, A	175
Borndorfer, R	191	Fernandez, F R	116
Bouvy, C	62, 170	Feyzioglu, O	66, 112
Bragge, J	29	Fiala, P	118
Brockhoff, D	152	Figueira, J R	27, 64, 134
Bryan, B	108	Fowler, J	20
Buyukozkan, G	66, 112	Fujino, T	48
Caballero, R	151, 175	Furems, E	185
Caliskur, B B	112	Galand, L	85
Calvete, H I	103	Gale, C	103
Cast, A	108	Gandibleux, X	121, 193
Ceder, A	8	Geiger, M J	88
Celik, M	50, 115, 179	Gel, E	20
Cevik, S	184	Gillingham, E	139
Chen, S H	51	Gomez, T	175
Chen, T Y	24, 75, 155	Gonzalez-Pachon, J	83
Chen, Y W	117	Gorobetz, M	41
Chen, Z	97, 106	Grandgirard, A	108
Chianglin, C Y	101, 183	Greco, S	18, 27, 77, 93
Choo, E U	34	Guerro, F	175
Chu, S C K	81	Hafiz, R	158
Coello Coello, C A	64, 151	Hajkowicz, S	109
Colaco, S	68	Hamalainen, R P	35

Hashim, H	11	Loukil, T	120
Hassell, P	5	Lundie, S	110
Hatton MacDonald, D	108	Luque, M	22
He, J	53	Mabin, V	138, 139
He, W	71	Mackin, P	25
Hector, D	124	Maddulapalli, A K	95
Henrich, F	62	Maher, R	5
Hernandez-Diaz, A G	151, 175	Marichal, J L	79
Higgins, A	109	Marinoni, O	109
Hohm, T	152	Marquis, J	20
Ilker Topcu, Y	179, 184	Matarazzo, B	18, 93
Iniyan, S	49	McCreless, T	25
Jensen, A V	149	Mela, K	44
Joao, I M	134	Meloysund, K	177
Jones, D F	82	Meyer, P	79
Jou, C C	40	Michalowski, W	89
Kao, C	148	Miettinen, K	143
Karpak, B	162, 182	Mikhailov, L	65
Kausch, C	62, 170	Molina, J	151, 175
Kazemi, M	168	Mor-Yaroslavtsev, A	92
Keith, M	25	Mousseau, V	27, 77
Kempener, R	164	Munoz, M M	23
Khalili Araghi, M	165	Naegele, P A	102
Kitamura, K	48	Nagurney, A	61
Klinkenberg, J W	13, 153	Nakayama, H	46
Knowles, J	65	Nemery, P	38
Kojadinovic, I	73	Ning, Z	126
Koksalan, M	20, 84	Ortuno, M T	1
Komarova, N A	99	Pao, H L	148
Korhonen, P	20, 29	Parragh, S N	121
Koski, J	44	Pathak, B K	63
Ku, T C	75	Pato, M V	68
Kunicina, N	6, 133	Peng, Y M	155
Labreuche, C	73	Perez, F	151
Lai, E	110	Perez-Gladish, B	171
Larbani, M	117	Perny, P	85
Ledgard, S	180	Petrie, J	124, 164
Lee, C K	135	Petrovsky, A B	99
Leleur, S	149	Pitty, F M	52
Levchenkov, A	41, 92, 125	Preuss, M	62, 170
Li, A	53	Pruyt, E	128, 130
Li, D	172	Puerto, J	116
Li, X	82	Raith, A	7, 87
Li, Y W	24	Ribeiro, C C	58
Liao, F C	135	Riteau, P	193
Lin, C C	157	Roberts, J	139
Lin, C W	51	Rodriguez Uria, M V	171
Lin, T R	157	Romero, C	83
Li-qiang, Y	126	Roy, A	25
Liu, Q	71	Ruiz, F	22, 23
Lokman, B	84	Ruiz-Rivas, A	1

Ryan, D	9, 12	Weistroffer, H R	70
Saarinen, E	35	Wenstop, F	177
Sauian, M S	11	Wibowo, S	114
Scheubrein, R	132	Wijnmalen, D	128, 130
Schlechte, T	191	Wilk, S	89
Schmick, G	25	Woehrle, M	152
Schuetze, O	64	Xie, X	95
Schwand, C	96	Xu, D L	95
Seppala, T	16	Yamouchi, H	48
Shao, L	15	Yan, N	97
Sheath, G	180	Yang, J B	95
Shi, Y	53, 55, 97, 145, 188	Yang, L	158
Shih, H S	40	Yoshikawa, M	48
Shir, O M	153	Yu, M M	135
Shirakawa, M	46	Yu, P L	101
Shyur, H J	40	Yu, Z	71
Skulimowski, A M J	104	Yun, Y	46
Slowinski, R	18, 27, 77, 93	Zarghaami, M	141
Smeaton, D	180	Zeiler, W	137
Spanjaard, O	85	Zhang, D	55, 145, 188
Srivastava, K	63	Zhang, Y	53
Srivastava, S	63	Zhang, Z	55, 71
Steuer, R E	16, 22	Zhi-xiang, T	126
Stewart, T J	17, 123	Zhu, L	81
Sumpf, D	42	Zhu, M	81
Susarapu, S R	70	Zitzler, E	154
Szidarovszky, F	141		
Talbi, E G	64		
Tam, B	12		
Tantar, E	64		
Teghem, J	120		
Temesi, J	30		
Terai, H	48		
Thijssen, A	89		
Tian, Y	55, 145, 188		
Ting, S C	52		
Topcu, I	162		
Tsui, C W	24, 75, 155		
Tzeng, G H	51, 157		
Vetschera, R	96		
Vinogradova, B	6		
Vishal, N V R	49		
Vitoriano, B	1		
Wakolbinger, L	96		
Wallenius, H	29		
Wallenius, J	20, 25, 29		
Wang, J	7		
Wedley, W C	32		
Wei, H	126		
Weide, O	9		