NEWSLETTER

August 2010

Operational Research Society of New Zealand, Inc.
PO Box 6544, Wellesley St. Auckland, New Zealand, www.orsnz.org.nz

Contents

The newsletter is published three times per year. Regular dates are April, August, and December. Submissions deadline is the 15th of the month for the following month's issue. Send contributions by email to the Newsletter editor, Kenneth Kuhn, at newsletter@orsnz.org.nz.

President's Report

I'm pleased to begin our second newsletter of 2010 by reporting that the work of two of our members featured amongst the finalists of the recent EURO conference Practice Award. These included Mikael Rönnqvist who presented his online optimal process control for paper mills. This is an area Mikael has been active in for many years, and has achieved great results replacing standard approaches with optimization algorithms. The winner of the Practice Award, however, was a web-based solution for immunisation in the US. This topic will be familiar to many of you as the subject of Faram Engineer's presentation at our last conference, work for which Faram won the 2009 ORSNZ Young Practitioner Prize. Faram tells me that the presentation at EURO was indeed based on the work he undertook at Georgia Tech, with recent improvements having been made by other students. Congratulations to both Faram and Mikael for featuring as a winner and finalist respectively in this high profile competition.

No more GST

At the last Annual General Meeting, it was agreed that the ORSNZ would deregister for GST. I am pleased to report that this has now happened, and so you will have noticed that your subscription requests no longer include GST. Our treasurer, Andrea Raith, is pleased to have now submitted our very last GST return, and is looking forward to having nothing to do with the forthcoming GST increase.

You may also have noticed that there is now an option to pay your ORSNZ online using a credit card. This functionality extends the online credit card processing we put in place for conference registrations. This new option has proved very popular, with about half of our payments being made this way.

Open Source Initiatives: PuLP, Dippy, OpenSolver

Many of you will be aware of the open source initiative COIN-OR that makes high quality linear and integer programming solvers available to the OR community. The ORSNZ has good connections with COIN-OR through Ted Ralphs, who visited NZ as the 2008 ORSNZ Visiting Fellow and presented at branch meetings. Thanks to Ted's visit, the Auckland OR group is now an active contributor to the open source world. Stu Mitchell has been instrumental in developing PuLP, which provides an easy-to-use Python environment for building and solving linear and integer programs. PuLP works with a range of solvers, including the COIN-OR engines. (Incidentally, Stu has also been instrumental in introducing Python to our computational techniques courses, a move that has proven very popular with the students.)

Working closely with Stu, Michael O'Sullivan, Cameron Walker and student Qi-Shan Lim have developed Dippy, a Python-based framework that gives easy access to the COIN-OR DIP (Decompositon in Integer Programming) package developed by Ted Ralphs and Matt Galati.

Dippy makes it easy to experiment with customised branching and column generation strategies for complex optimisation problems. This is a huge step forward for anyone interested in this area.

I recently needed to solve large integer programs in Excel as part of a consulting project. I could have recommended upgrading to the Frontline Premium solver, but this felt like a backwards step given the availability of good COIN-OR solvers. Instead, guided by Stu Mitchell's experience working with COIN-OR code, I developed OpenSolver, an open source Excel add-in that allows spreadsheet models to be solved using the COIN-OR CBC engine. OpenSolver works on standard Solver spreadsheet models without requiring any changes. It does not have the problem size limits found in Solver, and so allows much bigger linear and integer programming problems to be solved. (This may become more important as Solver's 200 variable limit appears to be reduced in the beta versions of Excel 2010.) OpenSolver is also typically much faster than Solver for difficult problems, and provides additional features that I needed to repeatedly solve closely related models. Using OpenSolver, we ended up with a system that anyone could use and was fast enough to be run in real time during management meetings.

It has always annoyed me that optimization models get represented twice in a spreadsheet, once on the sheet itself and then again inside Solver. OpenSolver partially addresses this by allowing the Solver models to be visualized directly on the spreadsheet. I have found it much easier to debug a spreadsheet this way than by tediously stepping through the Solver constraint formulae.

One of our Engineering Science students, Iain Dunning, has been extending OpenSolver so that it can automatically build an optimization model by analysing the formulae in a spreadsheet. Iain's made great progress on this, and his code now seems to be working well. We hope to release this shortly.

At last year's conference, Nicola Petty spoke about her YouTube Solver videos, and the tools available to track viewer numbers and details. After setting up the opensolver.org website, it has been interesting to track hits using the Google Analytics software. A few weeks ago OpenSolver was blogged by Mike Trick, whom many of you will remember as our 2007 ORSNZ Visiting Fellow. The spike that Mike generated in my hits graph is a tribute to the influence that Mike has in the OR world.

For those of you interested in these projects, you can visit:

Dippy: https://projects.coin-or.org/svn/CoinBazaar/ projects/

Pulp: https://projects.coin-or.org/PuLP

OpenSolver: http://opensolver.org

Auckland ORSNZ Conference: Mon 29, Tues 30 November

Good progress is being made with organizing the next ORSNZ conference in Auckland. We are particularly pleased to have Professors Martin Savelsbergh and Tava Olsen confirmed as plenary speakers. Professor Savelsbergh has recently moved from GeorgiaTech in the US to a new position at the CSIRO in Australia where he is the Program Manager of Business and Services Analytics. Professor Olsen has also recently moved from the US to return to NZ to take up a position in Auckland as the Ports of Auckland Chair in Logistics and Supply Chain Management. We are thrilled to have such high calibre speakers attending, and are sure their presentations will be enjoyed by all.

For more conference information, please see the Call for Papers elsewhere in this newsletter, or visit http://conference.orsnz.org.nz for the latest updates.

I look forward to seeing you in Auckland in November.

Andrew Mason

President

23 July 2010

Operations Research Society of New Zealand

45TH ANNUAL CONFERENCE

Monday 29 – Tuesday 30 November 2010

University of Auckland, New Zealand

http://conference.orsnz.org.nz/

The Engineering Science Department at the University of Auckland is pleased to host the 45th Annual Conference of the Operations Research Society of New Zealand, ORSNZ'10, on Monday 29 and Tuesday 30 November, 2010, with a pre-conference social on the evening of Sunday 28 November.

The University of Auckland is located in the heart of Auckland city, just a short walk from the magnificent Waitemata Harbour with its beautiful beaches, idyllic islands and breathtaking scenery. Auckland is an ideal gateway for further exploring New Zealand's many natural wonders.

Call for Papers

We welcome papers on any aspect of operations research, especially practical applications. Please email your abstract, in 200 words or less, in plain text, to the conference organisers at *conference@orsnz.org.nz*.

Deadline for abstracts: 30 September, 2010.

Following acceptance of your abstract, we shall invite you to submit a full-length paper for publication in the conference proceedings. A copy of the proceedings will be given to every attendee at the conference, and posted online. Full papers must be submitted by email in Postscript or PDF format to the conference organisers.

Deadline for full papers: 31 October, 2010.

Registration forms, guidelines for the preparation of full papers, and further information about the conference will be available on the conference website http://conference.orsnz.org.nz/

Student Travel Grants, Free Registration

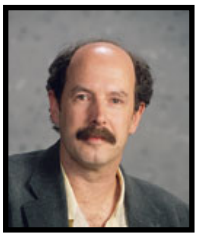
Full-time NZ students who present a paper at the ORSNZ conference can apply for travel assistance to attend the conference. Most students are also eligible for free conference registration. For further details, see http://conference.orsnz.org.nz.

Young Practitioners' Prize (YPP)

OR practitioners and students who will be under 30 years of age on the first day of the conference (29 November) are invited to compete for the ORSNZ Young Practitioners' Prize. The total prize money awarded will be $1,000, split between the authors of the best papers at the judge's discretion. Entry details are available at http://conference.orsnz.org.nz.

Plenary Speakers

We are very pleased to announce our two plenary speakers. **Professor Tava Olsen** of the Business School, University of Auckland, has recently returned to New Zealand after nearly 20 years in the United States to take up the Ports of Auckland Chair in Logistics and Supply Chain Management. She is also the Academic Director of the New Zealand Centre for Supply Chain Management.



Professor Martin Savelsbergh is best known for his work at GeorgiaTech as an optimization and logistics specialist. He has over 20 years experience in operations research including optimization methods, algorithm design, performance analysis, logistics, supply chain management, and transportation systems. He has published over 100 research papers in many of the top optimization and logistics journals. Martin has recently moved to Australia where he is the Program Manager of Business and Services Analytics at the CSIRO and is a Conjoint Professor at the University of Newcastle.

Andrew Mason

Chapter News

Auckland News

Greetings from Auckland. It has been busy since the start of the year and we are already well into the second semester activities. The semester break though provided an opportunity for some travel and a burst of research activity. During the break Matthias Ehrgott had the opportunity to attend the EURO2010 conference in Lisbon.

Andrea Raith went to Norway to TRISTAN VII (Seventh Triennial Symposium on Transportation Analysis) in June and Cameron Walker visited colleagues at the University of St Andrews, Scottland. Cameron and his collaborators are working on techniques to automatically generate landmarks for curves in 3D. In particular they were able to classify whale dives to determine whether ensonification affected their behaviour.

Recent work by Qi-Shan Lim, Michael O'Sullivan, Stuart Mitchell and Cameron Walker has resulted in Dippy, a Python interface between PuLP, a Python extension for modelling LPs and IPs, and DIP, open source optimisation code for IPs. Dippy has already been used successfully for a cutting-stock consulting project and will be used to teach final year Engineering Science students advanced IP techniques. For more information, contact Mike O'Sullivan.

The University spin-off company Optima was featured in the NZ Herald with an article about its recent success in the US market. Optima produces both an ambulance simulation product, based originally on work undertaken in Engineering Science at the University of Auckland, and a real-time ambulance redeployment package that moves idle ambulances to improve expected future call response times. The Optima software is reported to have saved Lee County US$750,000, a result that should help with future sales. Although it doesn't happen often, it's always good to see Operations Research being presented positively by the media.

Golbon Zakeri visited Center for Operations Research and Econometrics (CORE) at the Universite Catholique de Louvain and gave an invited presentation at the conference in honour of Yves Smeers' retirement. Yves is the Tractabel Professor of Energy Economics at UCL and is one of the world's top energy economics (see photo). *Golbon Zakeri*

Canterbury News

In March, Dr Gavin Bell presented his work relating to emerging CO2 markets in Europe to a joint meeting of the ORSNZ Canterbury branch, and the EPECentre, based in Electrical Engineering at Canterbury University. Similar seminars were presented in Auckland and Wellington.

Gavin completed his PhD in Management Science at Canterbury, and was part of the Energy Modelling Research Group here. Since then he has worked in consulting roles in the European power sector since and led the cross-commodity analysis team at Statkraft. The seminar "Living In a carbon based world: CO2 and its impact on the EU power sector" emphasised the complex interaction between different commodity groups such as power, fuels, and CO2 in the power sector, as well as describing the evolution and future of the European emissions trading scheme (ETS) and some implications of the scheme.

The EU ETS is basically a cap and trade system designed to reduce emissions in the EU. It is being implemented in three stages with an initial trial period, now expired, followed by second phase running through to the end of 2012, after which a final phase will commence, eventually leading to a full implementation by 2027. Each progression has brought increased flexibility in trading arrangements, while the allocation of free permits reduces along with the CO2 cap.

Trading restrictions between the schemes and a volatile world economy have seen carbon prices

fluctuate significantly. The final phase, scheduled to start in 2013, will progressively see the cap lowered by 1.74% pa, progressive increases in the fraction of permits that may be traded (to 100% on 2027) and, of particular importance to NZ, the ability to trade permits internationally.

Gavin described the complexity of interactions in the energy sector where carbon prices can have significant influence on operational and investment decisions in the power sector, which inevitably flow through to future emission prices and output patterns. Gavin presented several studies of likely carbon prices but suggested that aside from equilibrium approaches to forecasting the future price of carbon emissions, political impact may be just as significant, with European governments keen to set long term caps at levels that will drive investment in carbon capture technology.

Although Gavin did not major on this, the implications for NZ are interesting. Since we seem to be one of the few non-EU countries actually proceeding with an ETS, "international" trade would presumably mean that that the carbon component of NZ energy costs would be largely driven not just by supply and demand, but by regulatory and political conditions and perceptions in Europe. Market experience to date suggests that this could add significant volatility to NZ electricity prices, for example. That would necessarily impact on areas such as reservoir management strategy, creating a new challenge for stochastic optimisers.

We have also had the privilege of having Professor N. Chanaka Edirisinghe, Professor of Management Science at the University of Tennessee, visit us for 7 weeks. During his time here he taught two modules of our Management Science honours programme, interacted with our PhDs and research groups, and gave two very interesting seminars. The first seminar dealt with the use of stochastic programming methods for pricing financial options, while the second one was on the use of DEA analysis of company data in order to identify stocks that are either under or over valued by the market, using data from both the U.S. and Japan.

In May, Dr Deb Chattopahyay also presented a seminar to a joint meeting of the ORSNZ Canterbury branch, and the EPECentre, based in Electrical Engineering at Canterbury University.

Deb is currently with Saha International in Melbourne, but formerly taught in Management Science at Canterbury, and was part of the Energy Modelling Research Group here. In between, he worked for CRA, in Wellington, then Melbourne, and this talk summarised the methodology and key outcomes of two major modeling studies undertaken by CRA between 2006 and 2008 for the Australian National Generator' Forum. The topic was modelling carbon emission reduction from the Australian electricity sector, and the goal was to understand the full set of investment, price and financial impact on existing coal-based generators.

These studies employed a long term capacity and dispatch optimization model. The modeling results showed that the cost of meeting the target could be over $30 billion in NPV terms. Interestingly, and controversially, the model results showed very little impact from renewable technologies, with a mix of "clean coal", gas, and nuclear technologies being predicted to displace the existing stock of conventional coal fired plant. This is a rather important topic, given that electricity generation from "dirty coal" currently accounts for a large proportion of Australian carbon emissions, and a moderately vigorous debate followed.

Deb pointed out that, subsequently, nuclear had disappeared from the political agenda, and the cost estimates for "clean coal" now seemed much too optimistic. Grant Read noted that this was consistent with two subsequent studies he had reviewed for the Australian Electricity Market Commission which ignored both nuclear and clean coal options. But they placed considerable emphasis on new geothermal and solar technologies which were hoped to be "economic", but as yet unproven. Even so, those studies suggested that, given projected load growth over the next decade or so, the best that could be hoped for was to "hold the line" on existing electricity sector emissions, and hope that other sectors of the Australian economy would far exceed the targeted 20% reduction, or import credits from parts unknown. But then the regime assumed in those studies is now "on hold" anyway. Fritz Raffensperger countered this pessimistic assessment by citing evidence

from sulphur emissions markets in the US to support his view that a properly functioning carbon market would quickly identify and harvest "low hanging fruit", so that actually the world could be saved for future generations at quite low cost. Others expressed skepticism that climate change was even real, or that it really mattered since we were going to run out of energy anyway. It would be fair to say that no definitive conclusion was reached, but that modeling results do at least provide a provocative "factual" focus for such debates.

Grant Read, Ross James

Wellington News

No news provided.

Mark Johnston

Reports from Overseas Conferences

ALIO-INFORMS conference, Buenos Aires 6 – 9 June

(Association of Latin-Iberoamerican Operational Societies - Institute for Operations Research and the Management Sciences)

I was privileged to be asked to give an invited lecture at this conference on the topic "Forest Harvesting with Adjacency Branches and Column Generation." The conference was excellent with many interesting papers given on various applied and theoretical topics in operations research. Although the conference was international, there was a marked Latin American atmosphere. I learned quite a lot about specific South American case studies and met plenty of stimulating new academics, as well as renewing association with known international figures.

The conference was held in a most imposing grand old building in the style of the Auckland War Memorial Museum. It was part of the University of Buenos Aires Law School. I got to deliver my talk in a magnificent lecture hall with a huge mural across the front depicting events associated with the history of Argentina.

Outside the conference there were opportunities to sight-see. A minimal knowledge of Spanish was absolutely essential. The local people I found friendly and helpful. Various practical tasks such as how to take a ride in a bus presented daunting challenges. Buenos Aires is a great city with a wealth of fascinating places to see, but you have to be proactive in getting about.

This was my first conference in South America and very different from those we are used to in North America and Europe. It was exhilarating.
If you have not yet attended a conference in these parts, I recommend you plan to do so without delay. And start learning Spanish.

Alastair McNaughton

The Joy of Form Design

This year, to squeeze a bit more space out of the subscriptions form, we redesigned the credit card section. The design changes are shown below. No major changes, just a small tweak I thought. How wrong I was. Even though it was *not* designed by a committee, and, unlike the notorious US Customs form, has *not* been approved under the Paperwork Reduction Act, this new form still fails about 50% of the time. Experience has now shown that humans fill out forms in a particular way that this design does not accommodate. I leave it as an exercise for the reader to spot the flaw. The correct answer will appear on next year's subscription form...

Andrew

Name on card:	
Expiry Date:	
Amount to Charge:	NZ$_____.___
Card Number:	
Signature:	

Figure 1: 2009 Credit Card form

Name on Card:		
Card Number:		
Expiry Date:	Amount to Charge: NZ$_____.___	Signature:

Figure 2: 2010 Credit Card form

Puzzle Corner

Rogo® is a version the subset-selection, prize collecting travelling salesperson problem. Tour length is limited to the given number of steps (squares) taken vertically or horizontally (not diagonally). The tour is a loop which does not visit a square more than once and avoids the black (forbidden) squares. Loops can start anywhere. The objective is to maximise the total score collected from those squares visited.

The best (maximum) score is given. The good score indicates a good, suboptimal, score. For all of these Rogos the loops are restricted to 20 steps. Rogos are created by Nicola Petty and Shane Dye on behalf of Creative Heuristics Ltd. See www.rogopuzzle.co.nz for more.

Rogo 1 — 20 Steps: Good 49 | Best 51

5	7			5		3
	■		5	■		5
	7		3		7	
3		■	3		■	
5		3			5	7

Rogo 2 — 20 Steps: Good 24 | Best 25

	4			2	■
2	■	3			4
	1		1		
		3	■	2	
	2		3		
2	■	1		2	
	2		2	■	2
		3		3	
	2	■	3		
		2			1

Rogo 3 — 20 Steps: Good 45 | Best 47

		3			7		6		4		7			7			5		9	
9		■		■															8
				4			5		1		7		■	9				4		
	3														■	4		■		
			8		9				5		■		5							
4							7											6		
	■		3						4		7		1			5			■	
5		9	■	4	■	3		3							8					
													6							9
		1	3				6		8		2					4			6	6
8					6							4		■						
	4		1					5			5					6		2		
						3			9		■		1							5
			9											5	■		6			
	6						5					3						■		
5				9		■				6						8				2
		4		■			■						1	6						
3										5						9		7		
		5		8				8				5		6			3			3
				■		3													■	
9					6		9			■	2				5			2		9

Call for participation: INFORMS Data Mining Contest 2010

The INFORMS Data Mining Section (in conjunction with Sinapse) is pleased to announce its third annual Data Mining Contest: http://kaggle.com/informs2010.

This contest requires participants to develop a model that predicts stock price movements at five minute intervals.

Competitors will be provided with intraday trading data showing stock price movements at five minute intervals, sectoral data, economic data, experts' predictions and indexes.

We have provided a training database to allow participants to build their predictive models. Participants will be evaluated according to the arithmetic mean of the AUC on the test database.

Being able to better predict short-term stock price movements would be a boon for high-frequency traders, so the methods developed in this contest could have a big impact on the finance industry.

The submission deadline is October 10th 2010. The winners of this contest will be honoured at a session during INFORMS Annual Meeting in Austin-Texas (November 7-10).

Visit the INFORMS Data Mining Contest web page for more details: http://kaggle.com/informs2010

Louis Duclos-Gosselin
Chair of INFORMS Data Mining Contest 2010
INFORMS Data Mining Section Member
Applied Mathematics (Predictive Analysis, Data Mining) Consultant at Sinapse
E-Mail: Louis.Gosselin@hotmail.com
http://www.sinapse.ca/En/Home.aspx
http://dm.section.informs.org/
Phone: 1-866-565-3330
Fax: 1-418-780-3311
Sinapse (Quebec), 1170, Boul. Lebourgneuf
Suite 320, Quebec (Quebec), Canada
G2K 2E3

Meetings Calendar

New Zealand

45th Annual Conference of the Operational Research Society of New Zealand
29 – 30 November, 2010, Auckland
http://conference.orsnz.org.nz

Asia Pacific

Conference for the International Federation of Operational Research Societies
10 – 15 July 2011, Melbourne, Australia
http://www.ifors2011.org

8th Annual Conference on Theory and Applications of Models of Computation
23 – 25 May 2011, Tokyo, Japan
http://www.jtlab.ice.uec.ac.jp/tamc

8th International Conference on Optimization
10 – 13 December 2010, Shanghai, China
http://www.fdsm.fudan.edu.cn/icota8/

International

INFORMS Annual Meeting
7 – 10 November 2010, Austin, USA
http://meetings.informs.org/Austin2010

Latin-American Algorithms, Graphs, and Optimization Symposium
28 March – 1 April 2011, Bariloche, Argentina
http://www-2.dc.uba.ar/lagos2011

USA/Europe Air Traffic Management Research and Development Seminar
14 - 17 June 2011, Berlin, Germany
http://www.atmseminarus.org

21st International Conference on Multiple Criteria Decision Making
13 – 17 June 2011, Jyvaskyla, Finland
https://www.jyu.fi/en/congress/mcdm2011

Winter School on Network Optimization
17 – 21 January 2011, Estorial, Portugal
http://netopt2011.fc.ul.pt/

International Conference on Operations Research
30 August – 2 September 2011, Zurich, Switzerland
http://www.or2011.ch/

VII ALIO/EURO Workshop on Applied Combinatorial Optimization
4 – 6 May 2011, Porto, Portugal
http://www.dcc.fc.up.pt/ALIO-EURO-2011/

19th International Symposium on Transportation and Traffic Theory
18 – 20 July 2011, Berkeley, USA
http://www.isttt19.org/

Officers of the Operational Research Society of New Zealand 2010

President
Andrew Mason
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 87909
Fax: 64 (9) 373 7468
a.mason@auckland.ac.nz

Vice President
Matthias Ehrgott
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 82421
Fax: 64 (9) 373 7468
m.ehrgott@auckland.ac.nz

Council

Treasurer
Andrea Raith
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 81977
Fax: 64 (9) 373 7468
a.raith@auckland.ac.nz

Secretary
Fernando Beltran
ISOM
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 87850
Fax: 64 (9) 373 7430
f.beltran@auckland.ac.nz

Newsletter
Kenneth Kuhn
Department of Civil Engineering
The University of Canterbury
Private Bag 4800, Christchurch
Phone: 64 (3) 366 7001 x 3328
Fax: 64 (3) 364 2758
kenneth.kuhn@canterbury.ac.nz

APORS/IFORS Rep, Liaison Officer
David Ryan
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 88398
Fax: 64 (9) 373 7468
d.ryan@auckland.ac.nz

Industry Representative
Geoff Leyland

Alastair McNaughton
Department of Statistics
The University of Auckland Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 85244
Fax: 64 (9) 308 2377
a.mcnaughton@auckland.ac.nz

Ross James
Department of Management
The University of Canterbury
Private Bag 4800, Christchurch
Phone: 64 (3) 364 2987 x 7015
Fax: 64 (3) 364 2020
ross.james@canterbury.ac.nz

John Paynter
Manager SRU
Uniservices/SOPH
Tamaki Campus
The University of Auckland
Private Bag 92019 Auckland
Phone: 64 (9) 3737599 x 82355
j.paynter@auckland.ac.nz

Stefanka Chukova
School of Mathematics, Statistics and Computer Science
Victoria University of Wellington
PO Box 600, Wellington
Phone: 64 (4) 463 6786
Fax: 64 (4) 463 5045
schukova@mcs.vuw.ac.nz

Andy Philpott
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 88394
Fax: 64 (9) 373 7468
a.philpott@auckland.ac.nz

Branch Chairs
Golbon Zakeri (Auckland)
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 84613
Fax: 64 (9) 373 7468
g.zakeri@auckland.ac.nz

Mark Johnston (Wellington)
School of Mathematics, Statistics and Computer Science
Victoria University of Wellington
P.O. Box 600, Wellington
Phone: 64 (4) 463 5699
Fax: 64 (4) 463 5045
Mark.Johnston@mcs.vuw.ac.nz

Grant Read (Christchurch)
Department of Management
University of Canterbury
Private Bag 4800, Christchurch
Phone: 64 (3) 364 2987 x 6885
Fax: 64 (3) 364 2020
grant.read@canterbury.ac.nz

Web Master
Andrew Mason
Department of Engineering Science
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 87909
Fax: 64 (9) 373 7468
a.mason@auckland.ac.nz

Honorary Advisor
Paul Rouse
Department of Accounting and Finance
The University of Auckland
Private Bag 92019, Auckland
Phone: 64 (9) 373 7599 x 87192
Fax: 64 (9) 373 7406
p.rouse@auckland.ac.nz

The ORSNZ web site is http://www.orsnz.org.nz. Email contact: secretary@orsnz.org.nz.

To apply for membership or buy subscriptions, see the application form on our web site, and mail it to: Membership Secretary, ORSNZ, PO Box 6544, Wellesley Street, Auckland, NZ.

Use MATLAB® to Build Your OR Models

Request your free MATLAB kit NOW

MATLAB has all the tools you need to handle Operations Research (OR) problems of any depth. It will let you use the pre-packaged tools easily, and you can modify the code used if you wish.

Accessing data – Connect to live data services or ODBC.

Optimisation - Functions for linear programming, quadratic programming, nonlinear optimisation, nonlinear least squares, solving systems of nonlinear equations, multi-objective optimisation, and binary integer programming.

Statistics - Functions and interactive tools for modelling data, analysing historical trends, simulating systems, developing statistical algorithms.

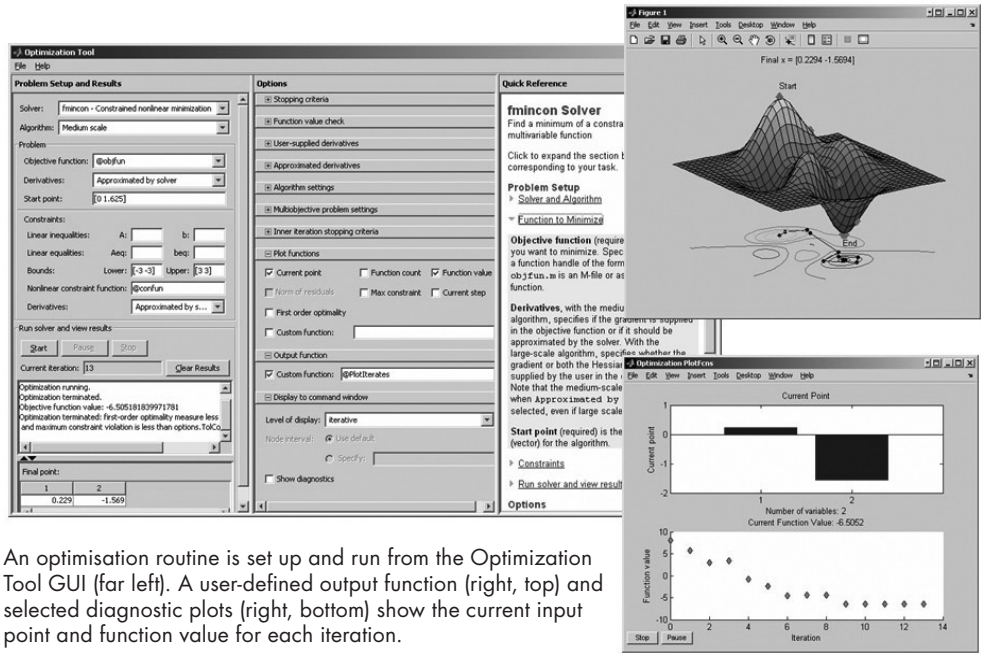
Econometrics techniques – Functions for modelling economic principles and behaviour, with a focus on volatility modelling.

Financial analysis - Optimise portfolios, estimate risk, analyse interest rate levels, price equity derivatives, and handle financial time series.

Graphical data presentation - 2-D and 3-D plotting functions, 3-D volume visualisation functions, tools for interactively creating plots, and the ability to export results to all popular graphics formats. You can customise plots by adding multiple axes; changing line colours and markers; adding annotation, LaTeX equations, and legends; and drawing shapes.

Algorithm development - Program and develop algorithms faster than with traditional languages because you do not need to perform low-level administrative tasks, such as declaring variables, specifying data types, and allocating memory.

Object-oriented programming - Define classes and apply standard object-oriented design patterns in MATLAB that let you benefit from code reuse, inheritance, encapsulation, and reference behaviour without engaging in the low-level housekeeping tasks required by other languages.



An optimisation routine is set up and run from the Optimization Tool GUI (far left). A user-defined output function (right, top) and selected diagnostic plots (right, bottom) show the current input point and function value for each iteration.

Distributing compiled applications - Share your MATLAB application as an executable or a shared library using a royalty-free runtime engine provided with MATLAB. Build graphical user interfaces within MATLAB. Package your application to work within Excel so your users see a familiar interface.

MATLAB® & SIMULINK®

HRS
Hoare Research Software Ltd

Five Ways to obtain your FREE MATLAB for OR Information Kit:

1. Email 2618@hrs.co.nz
2. Visit www.hrs.co.nz/2618.aspx
3. Call 0800 477 776 or 07 839 9102
4. Fax a copy of this form to 07 839 9103
5. Mail a copy of this form completed to: HRS, PO Box 4153, Hamilton East.

Note: Please ask for your FREE MATLAB for Operations Research information kit and quote lead reference 2618 when contacting us.

Complete your contact details below:

Name:_____
Position:_____
Department:_____
Organisation:_____
Address 1:_____
Address 2:_____
City:_____
Phone:_____
Fax:_____
Email:_____
Your industry:_____
Your particular interest:_____
_____
_____