NEWSLETTER

Operational Research Society of New Zealand (Inc.)

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EDITOR: GARY ENG
P.O. Box 904,
WELLINGTON.

AUGUST 1985

rom the Editor

inear Programming (LP) is probab- y the most widely used of all O.R. echniques. It certainly is one of he most misused and abused.
extbooks on the subject abound. ost O.R. students are taught the implex Method and even non-O.R. eople find their own applications rom amongst production/allocation ransportation, product/feed mix, efinery modelling, economic plan- ing, etc. The basic idea of maxi- izing or minimizing an objective ubject to a set of constraints nd having the solution tell you hat to do is at once simple and ppealing, especially when the re- ipe is a standard algorithm. In his age of information and compu- ers,data is seemingly no problem; or is number-crunching power,even n micros.
owever, we hear of as many LP isasters as success stories. Why? s it the fault of the LPers, the eachers or the technique itself? n my experience unsuccessful LP sers only have themselves to lame. Too many users are unaware iat rubbish in is rubbish out. ponsors of large models(and some- imes the model developers) under- itimate the commitment in terms data, manpower and computing iat such models usually require. ten the reason for modelling is izzy or lost - for insight or for swers?
e usual lame excuse for an LP ilure is usually found among it was the data; there are economies of scale; 3)integer variables; 4) nonlinearities. If only the user knew that there are ways around these problems or else you are using the wrong tool.
I once heard a certain economist (a member of ORSNZ!) say that if a model goes wrong you shoot the modeller; not the model! My senti- ments exactly! Although to protect myself, I would say the modeller's boss!
During this year's Conference, we are privileged to have the pre- sence of Prof George Dantzig. He will speak on "The Origins of LP" and "Solving Large Scale LPs". On the morning after the conference he will give a seminar on an application of NLP to "Energy/Eco- nomic Growth and Dynamic Equili- brium".
BE THERE to gain some insight into how it is done. And share the expertise and experience of a great LPer.

ANNUAL CONFERENCE

with

KEYNOTE SPEAKER

PROFESSOR GEORGE B DANTZIG

2 & 3 SEPTEMBER 1985

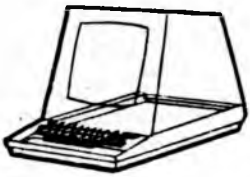
Victoria University of Wellington
Hugh McKenzie Building, HM1
Kelburn Parade
WELLINGTON

1985 STUDENT PAPER

1st: Ian Twomey - Auck Uni.
"Corporate Planning at N.Z. Steel"

2nd: Craig Mcloed & Nicola Ward - Canty Uni.
"Tunnel House Scheduling for Brookby Farm"

Congratulations!



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Folklore Terminal Club
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USA

WELCOME TO NEW MEMBERS

The following are from David Ryan's classes at TAM Dept, Auckland University:

- Colin Garlick
- Alex Geers
- Malcolm Halliday
- Leon Higgins
- Alister Hookings
- Joanne Keestra
- Beth Regan
- Martin Rowe
- Stephen Tordiech
- Ivan Vuletich
- Thomas Yee
- Ian Twomey (Student Paper Prize winner)

And two student members from the Mainland:

- Nicola Ward - Canty U.
- Craig Mcleod - "

BIRTH NOTICE: Gregory (initially known as 'XY'). A son for our President, Bruce Benseman and his (better?) half, Julie. A brother for Timothy.

No fears of the impending communist takeover by Kevin Hall, and SAS. Our ex-V-P has gone to Hong Kong to set up SAS operations on the British colony.

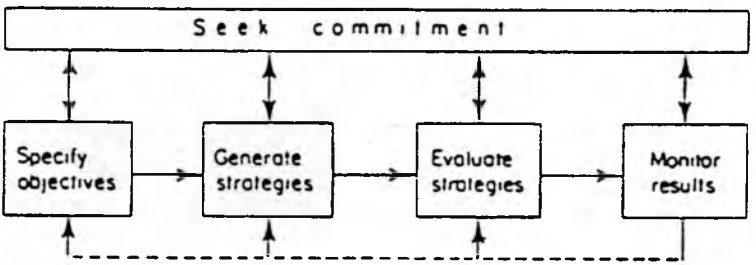
One of our Conference organisers David Whitaker, has been attracted away from Victoria University by the DSIR (Anything the Private Sector can do, we can do too.) He will become AMD's man in Auckland.

Forecasting and Strategic Planning, Professor J Scott Armstrong
Wellington, 30 July 1985

If you were after answers to the question "how do I forecast demands for 10000 products in inventory?" then you would have been disappointed. But Professor Scott Armstrong's advocacy of formal methods for strategic (long-term) planning was both humorous and persuasive. He spoke mainly about his research on various published studies, and how successful formal methods had been compared with informal methods. He also gave guidelines for forecasting, though these had been given fuller treatment the previous day.

His main recommendations were to:
1. separate planning from the forecasting process;
2. do separate forecasts for different possible situations eg environments, capabilities, and strategies;
3. develop a model if possible.

Scott said getting commitment was the key to successful planning. There are 4 important steps which should be dealt with explicitly and formally (see the figure). Commitment must be maintained throughout the process.



Formal strategic planning process

This is described more fully in Scott's paper "The Value of Formal Planning for Strategic Research" in Strategic Management Journal Vol 3: 197-211 (1982).

The meeting was held in Turnbull House next to Wellington's political hot-spot. Despite the atypically wet and windy day, about 100 people packed the room, some standing, showing what interest there is in this topic.
Scott covered a lot of material, with a great deal of pizzaz, providing many useful pointers for better planning.

Vicky van den Broek.

CONFERENCE CALENDAR

1985		
Sept	10-12	12th IFIP Conf. on Systems Modelling & Optimization (Budapest, Hungary)
Dec	27-30	Modelling & Simulation - Int. AMSE Conf. (Gorakhpur, India)
1986		
Jan	23-25	The Society for Computer Simulation Multi-conference (San Diego, California)
Mar	19-21	8th Annual Conf. on Computers & Industrial Engineering (Orlando, Florida)
May	20-23	CAPE '86 - 2nd Int. Conf. on Computer Applications in Production & Engineering (Copenhagen, Denmark)
Sept	2-4	Economics & Artificial Intelligence - 1st IFORS/IFIP/IFAC Int. Conference (Aix-en-Province, France)
	16-19	EURO VIII (Lisbon, Portugal)

Further details available from Vicky van den Broek-Mabin, Box 904, Wellington(ph 727-855)

PRINCE & PRINCESS OF WALES SCIENCE AWARDS

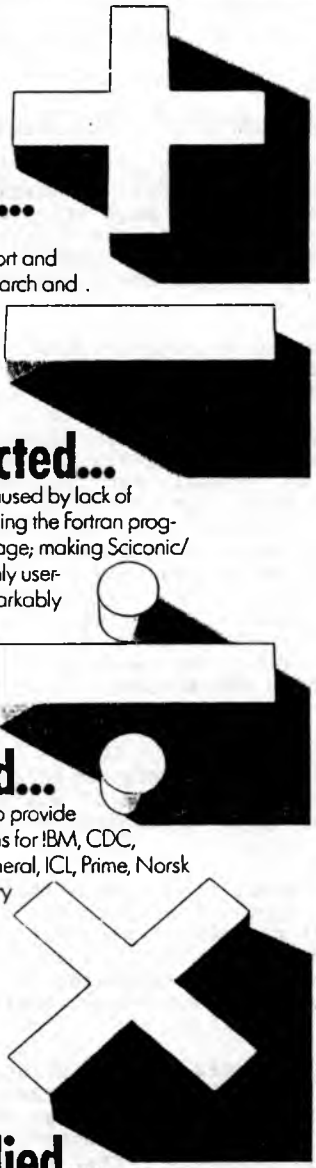
Closing date for these awards is 31 August. (See March newsletter.) Application forms available from Royal Society of NZ, P.B., Wellington.

NEW JOURNALS/BOOKS

"Annals of Operations Research" (Editor-in-Chief P.L.Hammer)
"Queueing Systems" (Ed-in-Chief N.U.Prabhu)
Special private subscription rates. Contact: Drs W.H.Wimmers, Science Publisher, Limburghof 4, 1083 Amsterdam, The Netherlands

"Operational Research for Decision Support" (Proceedings of the O.R. Symposium on DSS, Singapore, 11-13 April 1985) ISBN 9971-62-099-5, 352p($60 approx) Contact: O.R. Society of Singapore, c/o Dept of Industrial & Systems Engineering, National University of Singapore, Kent Ridge, Singapore 0511, Rep. of Singapore.

"Journal Contents in Quantitative Methods", ISSN 0142-5951, is a monthly publication that lists contents pages of about 120 journals in O.R.(24), statistics (51), economics (16), finance(7), marketing(8), production(5) and the behavioural sciences(11). $116 approx/year. Inquiries to: The Editor, Journal Contents in Quantitative Methods, Dept of Mgmt Sciences, University of Manchester, Institute of Science & Technology PO Box 88, Manchester M60 1QD, England



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I.F.O.R.S.

INTERNATIONAL FEDERATION OF OPERATIONAL RESEARCH SOCIETIES

letter from the president

"A PRIORI" KNOWLEDGE THROUGH MATHEMATICAL MODELS

No. 30, June 1985

Immanuel Kant (1724-1804), the German philosopher, wrote in the preface to his "Metaphysical Foundations of Science" (1786): "**I however declare that each particular discipline contains only as much science as it contains mathematics.**" This statement was based on the insight that only formal reasoning - in the sense of mathematical precision - could produc "**a priori**" knowledge about the nature of objects and that only such knowledge is **apodictic**, i.e. certain.

This applies to the role of mathematics in Operational Research and Management Science (OR/MS) as well. Take for example the "a priori" knowledge about **queuing** systems that has been developed by queuing theory. In the simplest case (M/M/1), random arrival with an average of p per time unit is assumed. Formal reasoning leads to an exponential distribution of the time distance between two arrivals or - as its inversion - to a Poisson distribution of arrivals per time unit. Similar derivations lead to the equivalent distributions of service time or units served per time unit, respectively - with a service rate of q units per time unit in the average. One can then derive a formula for the probability that i units are in the system at the same time. Further deduction leads to the well-known formula for the average number n=p/(q-p) of units in the system. Its application brings about surprising results, for example: The queue contains n=2 units in the average if the system is only occupied at a rate of p/q=2/3, and n=4 units for p/q=80% and n=9 units for p/q=90%. Such knowledge about queues is apodictic for any case in which the assumptions are met (and can be used as a good approximation for many other cases).

Without such formal - mathematical - reasoning, only empirical "**a posteriori**" knowledge could be produced. Independent of how many real queues were examined, empirical results would never lead to apodictic "a priori" knowledge.

However, Kant ought not to be misunderstood in the sense that mathematics per se would raise a discipline to the level of a science. It is not mathematics as such, it is the **internal content** of mathematics in a discipline that makes it a science. That means that mathematics (or formal reasoning) have to contribute to the **understanding of the objects** under study. These objects ought not to be only virtual, instead they have to have **significance** in reality.

Kant would also be misunderstood if one assumed that "a priori" knowledge could be produced for any kind of question. This is not true. For instance, there exist no doors towards "a priori" knowledge of the outcome of most social and political processes in "purposeful systems" (Ackoff and Emery). "A priori" knowledge (through formal reasoning) can be produced primarily for **cause-effect** mechanisms, to a much lesser extent for **means-end** relations and to no degree at all for the evaluation and setting of **ethical** values and **aesthetical** qualitites. In OR/MS we have to deal with all of these four dimensions.

Heiner Müller-Merbach
President of IFORS