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WHATS INSIDE

From the Editor

2011 Accomplishments and A Taste of 2012

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We used to dedicate one issue of IFORS News to the Annual Report. This year, we have a full issue that complements the 2011 Annual Report. The year had been a most productive one for the Administrative Committee, as can be gleaned from the President Dominique de Werra's summary of the activities undertaken for the year.

Activities continued on into 2012, as you can see from the OR Schools conducted in Africa and Brazil and those being planned for in Ukraine and Portugal. It is always very refreshing to see these young people, all enthusiastic about OR and benefiting from the various programs made available to them by IFORS and other sponsors.

Conferences that were held within ALIO, EURO and APORS are covered. IFORS was well represented in the conferences that happened in Peru, Portugal and Nepal. I met the Developing Countries Section editor Arabinda Tripathy at the Nepal conference, and his perspectives on that conference are here printed. He also forwarded a very interesting experience of the South African society which faced the multilingual aspect of publishing a journal.

Speaking of journals, we cover a milestone issue of ITOR – its first as an ISI indexed journal, and its first issue to cover tutorials. To give you a flavor of one of these tutorials, we print a piece on revenue management by IFORS Treasurer Peter Bell. He also writes the editorial, which raises some very important and timely issues in publishing, gathered from his years of being up close and personal with this area.

We always take the opportunity to give our readers who are operations research professionals something that they do not encounter everyday. In this issue are articles in the realms of art, psychology and politics. Do read them and see how OR plays a role in these fields that may be seemingly distant from OR.

The first quarter of 2012 has seen a lot happening in the OR world. I do hope you'll let IFORS News in on what's up in your corner of this world

IFORS and OR publishing

Peter C. Bell <pbell@ivey.uwo.ca>

IFORS is an OR publisher. We own two journals: International Abstracts in Operations Research (IAOR) and International Transactions in Operational Research (ITOR). These two journals contribute the lion's share of IFORS income and so maintaining and nurturing these journals is a priority.

Over the last few years, OR publishing has changed markedly. Two trends dominate these changes. The first is the rise in the number of articles being submitted for publication and the second is the increase in the number of 'journals' which publish OR work, particularly the growth of open access on-line journals.

The number of articles circulating the journals looking for a publication outlet has exploded and will continue to do so: major journals now receive well over 1,000 submissions annually and this number is increasing. The educational job market is a powerful submission motivator with the result that some articles are submitted several times, starting with an "A" journal and, if rejected, moving to an "A-" journal, and then a "B" and trickling on down. This kind of submission 'strategy' is rewarded by university promotion policies that tend to assign reward 'points' based on the highest level of journal achieved. While some authors use the review process to improve their work and revise their articles, others appear to resubmit the same article repeatedly: it is quite common to receive an article for review that is seriously out-of-date. The result of all this is that while the inflow of new articles is growing fast, the stock of rejected articles circulating around looking for a publication outlet is growing even faster. At the same time, the resources available to review all these articles have pretty much stayed the same and we are now consuming ever-increasing quantities of reviewing resources that the beneficiary (the author or university) does not pay for.

"...while the inflow of new articles is growing fast, the stock of rejected articles circulating around looking for a publication outlet is growing even faster."

The second major trend is the explosion of new open access 'journals' looking for OR work to publish. Hardly a week goes by without an announcement of a new journal. The unknown here is the quality of the accepted articles. Perhaps over time, reputations will be built and some high quality open-access on-line journals will be recognized.

These trends effect both IFORS publications, but in different ways. ITOR is thriving under the capable leadership of Editor Celso Carneiro Ribeiro. ISI indexing has been achieved and submissions are on the increase: Celso is looking for articles to publish and his editorial and reviewing team have successfully focussed on offering authors prompt reviews. The slightly worrying news is that ITOR (in addition to most other journals) is detecting more examples of borderline or unprofessional author behaviours, including evidence of multiple submissions and plagiarism, including self-plagiarism. Valuable refereeing and editorial time is now being spent checking submissions for these.

IAOR is a unique OR abstracting journal under the leadership of Editor Preston White Jr. and his editorial team. As the number of new journals expands, IAOR's objective of abstracting all published OR articles becomes increasingly difficult to achieve. Many of the new journals appear to publish just about anything and so IAOR has somehow to assess 'quality' but IAOR has no history and is not set up to review articles or journals. Abstracting all the new journals will stretch IAOR editorial resources, but at the same time provides a lot of new material and adds to the value proposition of IAOR as a "one-stop shop" providing an indexed, searchable database of the OR literature.

Scientific journals were once published for readers who bought the journals to read the articles. Increasingly, scientific journals are now published for authors who benefit from their publications through employment and promotions. As an example, the motivation for the new open-access on-line journals is coming from authors looking for a place to publish since there is no 'fee' for a reader to access the journals. In mathematics and the sciences, it is common for authors to pay for publication through "page charges", but the value that the journal provides does not come from publication, but rather from the reviewing process; the author reaps the benefits as soon as the article is "accepted" not when it is eventually published (many major journals now list or pre-publish accepted articles.) Charging a fee to submit an article to a journal is a more attractive idea (perhaps the fee would be refundable if the article was published), since this "reviewing" fee would reconnect the recipient of the value of publication with the cost of reviewing and publishing. Such a reviewing fee might at the same time motivate more thoughtful behaviour from authors considering whether to submit a rejected article to one more journal.

For the moment IFORS publishing is healthy and we are not planning major changes. We invite you to send your best articles to ITOR and to make use of IAOR as you search the ever expanding list of OR journals to find relevant published work. The growing number of submissions to OR journals and the expanding list of journals for IAOR to abstract presents opportunities and challenges for IFORS. We welcome your ideas and suggestions on how IFORS might continue to move forward as a leading OR publisher.

ITOR Features Tutorials

Celso Ribeiro <celso@inf.puc-rio.br>

Celso Ribeiro, editor of the International Transactions in Operational Research (ITOR) announced the publication of the Volume 19, Nos. 1-2 special double issue that celebrates ITOR indexation by Thomson Reuters ISI (formerly known as the Institute for Scientific Information). Thomson Reuters ISI accepted ITOR into the Social Sciences Citation Index (SSCI) and the Science Citation Index Expanded (SCIE), with coverage from the 2009 volume. The journal should therefore receive its first impact factor in the 2011 Journal Citation Reports, to be released next year. This very first issue of the first full volume to be entirely published after indexation by Thomson Reuters ISI will certainly be a landmark for IFORS, ITOR, and the OR community

Included in this issue are 11 papers from the tutorials presented by distinguished invited lecturers at the ALIO-INFORMS Joint International Meeting held in Buenos Aires, co-sponsored by the Asociacion Latino-Iberoamericana de Investigacion Operativa (ALIO) and the Institute for Operations Research and the Management Sciences (INFORMS). The meeting was co-chaired by Irene Loiseau (Universidad de Buenos Aires, Argentina) and Ben Lev (Drexel University, USA). The tutorials give a broad and state-of-the-art overview of a number of relevant subjects in the field of Operations Research (OR). The papers are as follows:

» Vehicle routing problems with split deliveries by C. Archetti and M. Speranza is a survey on the vehicle routing problems with split deliveries, a class of routing problems where each customer may be served by more than one vehicle. The paper reviews the formulation, main properties and exact and heuristic solution approaches for the SDVRP and its variants.

» The concepts of revenue management: a tutorial by Peter Bell lays out the fundamental concepts that make up the field of revenue management (RM). Five basic ideas - overbooking, differential pricing, product protection, planned upgrades, and short selling- and their variants are discussed

» Operations Research in the natural resource industry by T. Bjorndal, I. Herrero, A. Newman, C. Romero and A. Weintraub reviews the most recent and seminal work in modeling and algorithmic developments in the natural resource sector of agriculture, fisheries, forestry and mining.

» Multicriteria path and tree problems: discussion on exact algorithms and applications by Joao C. N. Climaco and Marta M.B. Pascoal classifies the main exact approaches dealing with several multicriteria path problems putting in evidence the shortest path problem. It also reviews exact algorithms dedicated to the minimum spanning tree and the minimum cost/minimum label spanning tree problems. Model applications are presented.

» Fragile networks: identifying vulnerabilities and synergies in an uncertain age by Anna Nagurney and Qiang Qiang discusses some of the recent developments in the assessment of network vulnerability and robustness through appropriate tools that assist in the quantification of network efficiency/performance and the identification of the importance of network components, such as nodes and links.

» A tutorial on branch and cut algorithms for the maximum stable set problem by Steffen Rebennack, Gerhard Reinelt and Panos Pardalos is an overview of various characteristics of effective branch and cut type algorithms for the maximum stable set problem. Several facet-defining inequalities for the stable set polytope along with their separation routines are discussed.

» Sports scheduling: Problems and applications by Celso Ribeiro provides an introductory review of fundamental problems in sports scheduling and their formulations, followed by a survey of applications of optimization methods to scheduling problems in professional leagues of different sport disciplines such as football, baseball, cricket, and hockey. Scheduling of the annual Brazilian football tournament is presented as a case study.

» OR challenges and experiences from solving industrial applications by M. Ronnqvist describes and discusses aspects and requirements of industrial implementations of OR. Reasons behind the requirements, the OR challenge, how the requirements were approached and implemented, and general experience acquired from these implementations are discussed. The applications cover tactical, operational and real time applications for transportation, scheduling, routing, inventory and process control problems.

» Black Swans, New Nostradamuses, Voodoo decision theories, and the science of decision making in the face of severe uncertainty by Moshe Sniedovich looks at some of the issues that need to be taken into account in the modeling and analysis of decision problems that are subject to severe uncertainty.

» Multi-objective optimization using metaheuristics: non-standard algorithms by El-Ghazali Talbi, Matthieu Basseur, Antonio J. Nebro and Enrique Alba takes focus away from Evolutionary Algorithms that comprise the state-of-the-art techniques in metaheuristics for multi objective optimization. The paper takes a look at non-evolutionary metaheuristics, hybrid multi-objective metaheuristics, parallel multi-objective optimization, and multi-objective optimization under uncertainty.

» Using OR to adapt supply chain management best practices to humanitarian logistics by Luk N. Van Wassenhove and Alfonso J. Pedraza Martinez presents two cases of OR applications to field vehicle fleet management in humanitarian operations which illustrate that OR supply chain best practices applied to humanitarian logistics can result in significant improvements. >>

>> The content of this special issue is complemented by the paper titled "A decision support methodology for increasing school efficiency in Bolivia's low-income communities", co-authored by Joao Neiva de Figueiredo (Saint Joseph's University, USA) and Miguel Angel Marca Barrientos (Fe y Alegria, Bolivia). This work was awarded the IFORS Prize for OR in Development at the close of the 19th IFORS Triennial Conference held in Melbourne, Australia, on July 15, 2011. It describes a DEA-based decision support system methodology for increasing school efficiency with available scarce resources and sharing best practices across the network. The proposed model was implemented and is continuing to impact the education of a large number of disadvantaged children in Bolivia's poverty-stricken areas.

The importance of pricing decisions for effective supply chain operation

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Operational research (OR) has a long history of addressing supply chain decision-making. We have a large literature devoted to supply chain optimization, scheduling, logistics, planning, and design. There is, however, a danger that much of this literature lacks relevance in helping manage real-world supply chains, because much of this literature ignores product pricing as a tool to manage the supply chain. Applying ideas from revenue management (RM) (*for more on RM see "The Concepts of Revenue Management: A Tutorial", International Transactions in Operational Research, 19, January-February, 2012*) to supply chain operations can be very helpful and profitable as these real examples illustrate.

A major shipping company priced shipments by origin and destination and a ready-mixed concrete company priced deliveries by the cubic meter. Both these companies had the same 'capacity issue': they had more work than they could handle Monday to Thursday and not enough to fully utilize their capacity Friday to Sunday. The 'strategic' solution to this issue might be to take advantage of the high demand period and invest in additional capacity but in RM time-based seasonality often provides a revenue opportunity.

The 'golden rule' of RM pricing can be stated as: when demand is high price high, when demand is low price low. These two companies firmed up prices during the period of high demand and reduced prices during the slow period. Revenue went up and the 'capacity issue' went away. Since the revenue increase was accomplished using the same fleet working pretty much the same hours, profits went up by a much large percentage than revenues.

龙王沙滩裤 (Long Wang Sha Tan Ku Company: Ivey case 9B09E008) was a half billion Yuan company manufacturing 20 million clothing items (board shorts) annually. Demand was highly seasonal peaking in April-May for the northern hemisphere and October-December for southern hemisphere markets. The firm's solution was to use airfreight to extend the manufacturing period at peak times: by dramatically reducing shipping time, product can be manufactured a month later and still reach the customer on the same date. However, the invoice for airfreight last year consumed 46% of total profit. A scheduling/supply chain/logistics problem? Perhaps, but the firm tried the RM approach: they offered a small discount (2-3%) to customers who would agree to take early delivery. The result was a smoothing of the demand peaks, a reduction in air freight costs of almost 40% and an increase in profit of 25%.

Ben Craig, CEO of Craig Manufacturing (Ivey case 9B11E004) thought he had a scheduling or capacity expansion problem. His bottleneck operation was working at maximum capacity for four months of the year but spending the other eight months operating well below capacity. Craig won most of its work by bidding on requests-for-quotations (RFQs) and at busy times did not have sufficient capacity to allow bids on all the available RFQs but most of the year bid on every RFQ that came to their attention. Almost all RFQs specified a required delivery date and Craig Manufacturing was very proud of its outstanding record in meeting delivery dates. Ben's sales force (paid partly on commission) regularly used discounts to 'sweeten' their bids and increase the probability that Craig would win the work.

Ben considered expanding his bottleneck operation but then he heard about RM. After talking to some customers, he quickly learned that delivery dates were often fairly flexible for the customer although they were critical and causing scheduling issues for Craig Manufacturing. The challenge was to transfer the importance of delivery dates to the customer. The solution: instead of taking the customer's requested delivery date as given and quoting a single price on each RFQ, respond by offering four or five different delivery dates with different prices, using discounts to incent customers to move delivery dates to avoid peak manufacturing times. Implementation of this new pricing scheme posed the technical challenge of computing and quoting prices and delivery dates and also the managerial challenge of coming up with a new sales force compensation plan since the sales force no longer controlled pricing. After implementation, Ben reported that Craig manufacturing was now working at 100% capacity every month and expected to remain there for the next several years.

These vignettes were chosen to illustrate that fact that many 'supply chain problems' are the result of poor pricing decisions. The apparent 'supply chain issues' in these four firms were mostly eliminated by applying the basic idea of RM, without resorting to much heavy mathematics. >>

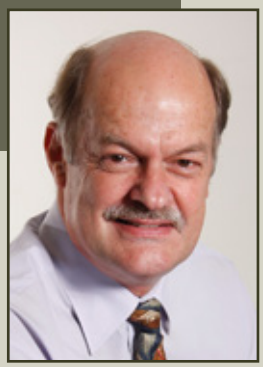
>> The basic issue for both managers and operational researchers is why it is that obvious pricing solutions to supply chain issues are often ignored. The answer appears to be the demarcation that exists in most firms between the marketing/sales group who typically control pricing and promotions and the plant management/operations control group who typically manage the supply chain. In many cases, the supply chain managers have no input into pricing or promotion decisions. In this environment, it is no surprise that when operational researchers frame their supply chain problems, they do so under an assumption that prices and hence quantities (or demand forecasts) are exogenous.

The key to successful operation of a supply chain is to understand demand and to use the levers available to change demand (particularly prices and promotions) along with the typical supply chain controls (schedules, inventories, capacities etc.) to achieve maximum profitability. The good news for OR is that these are large and challenging problems that will keep OR practitioners and researchers busy for many years. The less good news is that there are also major management challenges in integrating marketing and operations decisions: many marketing groups will fight hard to retain their decision-making autonomy.

Communication would seem to be the place to start: marketers need to be aware of capacity and scheduling constraints, while operations needs to understand the supply chain impact of possible promotional activities or pricing changes. An integrated supply chain model that includes prices and supply chain decisions will facilitate this understanding. A challenge ahead for OR is to develop these models and play an important role in the next step of integrated pricing and supply chain optimization.

A Star for ORiON

Hans Ittmann <hittmann01@gmail.com>



ORiON is the official journal of the Operations Research Society of South Africa (ORSSA). This journal was formally launched in 1985 and is published bi-annually. From its very early beginnings 27 years ago, this journal has grown to a high quality OR publication that is comparable to any international OR journal. The journal has an Editorial Board with an Editor-in-Chief (Prof Stephan Visagie is the current editor) and a number of Associate Editors as well as a Journal Manager. An Advisory Board consisting of many imminent international operations researchers supports the Editorial Board.

When the new democratic South Africa was established in 1994, one of the difficulties facing the new government was deciding on an official language. Ultimately the country adopted 11 official languages. This prompted ORiON to also change its language medium to the following, which is also the current policy regarding language use in the journal:

"Papers may be submitted in any of the eleven official languages of South Africa, viz Afrikaans, English, IsiNdebele, IsiXhosa, IsiZulu, Sepedi, Sesotho, Setswana, SiSwati, Tshivenda, or Xitsonga. However, the official language of correspondence between authors and editors is English."

The most recent edition of the journal, Vol 27, No 2, contains a paper written in Setswana. This is a very momentous event in the life of the journal as well as the Setswana language. As the ORiON editor writes:

"The second paper (in this edition) marks a historical event. It is the first paper of a mathematical nature written in Setswana – one of the eleven official languages of South Africa – that is published in a blind peer reviewed scholarly journal. My congratulations go to Tumo Baitshenyetsi, Giel Hattingh and Hennie Kruger for this achievement. They had to coin several new terms and terminology in Setswana to describe the technical aspects in the paper. This paper is titled: "Tiragatso Ya Itlhagiso Ya Setlhare Se Se Okeditsweng Ka Kgetsi Mo Bothateng Jwa Popo Ya Metato Ya Dipeipi Tsa Oli" (English: Applying an extended tree knapsack approach to an oil pipeline design problem.) This paper presents a tree knapsack approach to network design. A known case study from literature regarding the design of an oil pipe line network is considered. It is concluded that the specific network flow and design problem is solvable within a reasonable time frame by means of an extended tree knapsack approach."

When the new democratic South Africa was established in 1994, one of the difficulties facing the new government was deciding on an official language. Ultimately the country adopted 11 official languages. This prompted ORiON to also change its language medium

ORSSA has over the years promoted OR in its neighbouring countries and is deeply involved in IFORS and EURO initiatives to reach out to Africa. In addition, as is illustrated by this paper, ORSSA and its members have done a lot within the country to promote OR and encourage fellow South Africans to study OR and to publish in their own language. Getting the paper written in Setswana and peer reviewed posed its own challenges. In the process of "translating" the paper, many new words and terms had to be created since they did not exist in Setswana. A peer review process was possible through an extended abstract in English, which forms part of the published paper, while accredited Setswana language experts certified the translation.

The formal reference to the paper with the abstract, both in Setswana and English, follows:

Baitshenyetsi LT, Hattingh JM & Kruger HA, 2011, Tiragatso Ya Itlhagiso Ya Setlhare Se Se Okeditsweng Ka Kgetsi Mo Bothateng Jwa Popo Ya Metato Ya Dipeipi Tsa Oli, ORiON, 27(2), pp. 101-117.

Kakaretso. Go na le mathata a mantsi a ditshwetso tsa tiriso tse di welang mo mathateng a a mo setlhopheng sa kelelo ya kgokagano le palo e kgolo ya dikai tsa tiragatso tse di ka bonwang mo dikgaolong jaaka tsa neeletsanyokgakala, thwalo, boenjineri, saense ya dikhomphutara jalo le jalo. Mo pampiring e, kgonagalo ya go tlhagisa mmotlele wa kelelo ya kgokagano o o leng mmotlele wa kgokagano ya setlhare mme morago re e rarabolole ka go dirisa itlhagiso ya setlhare se se okeditsweng ka kgetsi ka go e batlisisa. Go bapisa le go tlhwatlhwafatsa thekeniki e e tlhagisiwang, thuto ya nnete e e totobetseng e e dirilweng (bothata jwa popo ya motato wa dipeipi tsa oli) e tlhophilwe go tswa mo dikwalong gore e dirisiwe go nna motheo wa porojeke e ya patlisiso. Ka go latela pono ya bothata jwa popo ya metato ya dipeipi, tlhabololo ya sekao sa setlhare se se okeditsweng ka kgetsi se tlaa tlhagisiwa. Tiragatso ya mokgwa o mo bothateng jwa popo ya metato ya dipeipi tsa oli e tlaa tlhagisiwa morago. Maduo a a bonwang a tlaa tlhagisiwa mme a bontsha gore go na le boleng jwa go ka dirisa itlhagiso ya setlhare se se okeditsweng ka kgetsi go ka rarabolola tse dingwe tsa mathata a kelelo ya dikgokagano.

Abstract. There are many practical decision problems that fall in the category of network flow problems and numerous examples of applications can be found in areas such as telecommunication, logistics, engineering and computer science. In this paper, the feasibility of representing a network flow model as a tree network model and subsequently solving it using an extended tree knapsack approach is investigated. To compare and validate the proposed technique, a specific case study (an oil pipeline design problem) was chosen from the literature that can be used as a basis for the paper. Following on an overview of the pipeline design problem, the extended tree knapsack model is developed. The application of this approach to the oil pipeline design problem is then presented. Results indicate that it is feasible to apply an extended tree knapsack approach to solve certain network flow problems.

Locals Support First International OR Meeting in Nepal

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The Operational Research Society of Nepal (ORSN) organized the International Conference on Operations Research with the theme "Operations Research for Sustainable Development" on its Fifth Annual day (February 1). The conference was held from February 1 to 2, 2012 at Nepal Academy of Tourism and Hotel Management (NATHM), Kathmandu.

The first of its kind in Nepal, the conference was successful in exposing participants from various disciplines to the huge potential of OR in optimizing resources within Nepal; to the multidisciplinary nature of the discipline; and to the significant role OR can play in sustainable development of the country. This also marks the first conference after ORSN was accepted into the International Federation of Operational Research Societies (IFORS) in November 29, 2011. IFORS Immediate Past President Elise del Rosario was on hand to welcome ORSN into IFORS and to let the participants know about IFORS activities. (See article insert reprinted from The Rising Nepal.)

The conference attracted some 92 participants and featured 33 paper presentations. Participants from the Philippines, Brazil, New Zealand, South Korea, and India joined the local participants from Nepal.

Ganesh Man Gurung, Chairman of University Grants Commission (UGC) of Nepal lights ceremonial candle as Sunity Shrestha, Elise del Rosario and Arabinda Tripathy and look on.

Leading the traditional inaugural lighting of the candle was Ganesh Man Gurung, Chairman of University Grants Commission (UGC) of Nepal. The inaugural session also featured the launch of the International Journal of Operational Research/Nepal (IJORN), >>

Successfully organized with the help of three organizing partners, two media partners, ten supporting organizations and thirty seven participating organizations, the conference pointed to the capability of ORSN to organize future international conferences.

>> the first issue of which was distributed to all the participants. Plenary sessions were given by Elise del Rosario (IFORS/Philippines), Pushkar Man Bajracharya (Nepal), Arabinda Tripathy and Subhash Datta (india). Due to unforeseen problems, James Cochran (USA) was unable to come. Devendra Bahadur Chhetry and Tanka Nath Dhamala each chaired a plenary session while Sunity Shrestha chaired an invited session. Prominent academicians and professionals from Nepal and abroad chaired eight technical sessions. Dipendra Purush Dhakal facilitated the panel discussion on the conference theme "Operations Research for Sustainable Development."

Successfully organized with the help of three organizing partners, two media partners, ten supporting organizations and thirty seven participating organizations, the conference pointed to the capability of ORSN to organize future international conferences. The possibility of ORSN taking a lead role for OR development in South Asia was cited as a possibility, since the South Asian Association for Regional Cooperation (SAARC) secretariat is in Kathmandu, Nepal. In the future, ORSN plans to establish Institute of Operations Research In Nepal.

Notes on ORSN from the OR for Development Section Editor

Arabinda Tripathy
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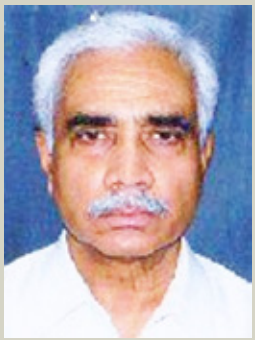

The conference was unique in some sense, as it brought together various stake holders; like academic institutes, government agencies, business enterprises and the like. The conference highlighted areas of concern and the way Operational Research can help in addressing these issues.

Nepal was one among many developing countries, who did not have an OR Society. The efforts made by Nepal in establishing one and to get the affiliation of IFORS is laudable. It is hoped that other developing countries, who do not have organised OR activities, will be inspired and take the initiative. This will also strengthen "Operational Research for Development" as experiences and lessons are shared among OR professionals in the developing world.


THE RISING NEPAL
www.gorkhapatra.org.np
THE FIRST & THE FOREMOST NATIONAL DAILY
Tools have huge potentials in growth and development Page 2
Vol. XLVII, No. 29, Kathmandu | January 13, 2012 | Push 29, 2068 | Nepal Sambat 1132 Pohelaga Chauthi | Friday | Pages 8+4 | Rs. 4.00

Above is the newspaper banner of a Nepali daily, The Rising Nepal playing up the Conference through a feature on OR. The feature was an interview with Elise del Rosario which appeared on page 2. In the excerpts that follow, questions by TRN (The Rising Nepal) are addressed by Elise (del Rosario).

OR tools have huge potential in growth and development

The Rising Nepal (TRN) - Just in the last week of November, the national Operational Research Society of Nepal was accepted into the international federation. How important really is having a national society? What benefits does one get out of it?

Elise- Indeed, the ORSN was accepted into the International Federation of Operational Research Societies (IFORS) last November 29. Let me take this opportunity to congratulate ORSN on behalf of the Administrative Committee of IFORS for this milestone. ORSN has successfully met the requirements and has been approved for acceptance after a 6-month ballot by the membership.

Being a part of a national society is important in that OR workers gain a lot from membership in a grouping where they can share their knowledge and benefit from the experiences and expertise of others. One cannot overemphasize the important role of a community in ensuring the continued health and development of the discipline within the geographical area.

TRN- And why do they have to get together to form an international federation? What is its reason for the existence of such a body?

Elise- Let me take you back to 1955 when a proposal to hold an international conference was sent by the vice-president of the US society (ORSA) to the secretary of the UK society (ORS). The French Society (SOFRO) joined as a sponsoring society to what would be the very first international OR conference. IFORS was thus founded by these three societies who felt the need to for an international body to look after the "the development of operational research as a unified science and its advancement in all nations of the world." IFORS has since then encouraged the establishment of national OR societies even as it continued to stimulate exchange of information on OR among nations through conferences, publications and other activities. >>

TRN- You mentioned developed countries as founders of the Federation. Will a developing country like Nepal benefit from this?

Elise- To me, Operations Research has always been about making the most of what you have – optimizing scarce resources. Who else would have more to gain than developing countries? The application of OR tools has a huge potential to bring them on the right path to growth and development. This is the reason why IFORS has a special committee on OR for Developing Countries. A lot of initiatives has been undertaken in this area, which includes a regular conference on development, various scholarship programs for young OR workers from developing countries, a competition that highlights OR work that had been done to address development issues, to name a few.

TRN- That brings to focus applied OR, in contrast to theory. Please enlighten us on the practice aspect of OR.

Elise- One just has to go to the US (INFORMS) and UK (ORS) websites to see how OR has helped thousands of companies enhance their operations, their profits and the services they provide to customers. Application areas are practically unlimited. IFORS has embarked on a survey of OR practice among its member countries. Although the UK and US had the most respondents, practice is flourishing in other parts of the world, developing countries, included.

TRN- What future do you see for the ORSN?

Elise- I belong to the Operations Research Society of the Philippines (ORSP), which will be celebrating its 25th year of founding next year. Like the ORSN, ORSP is a very small organization, compared, let us say, to IT or Management professional associations. However, the quality of the people, the leadership, the enthusiasm of the members are very important ingredients that have made the society last as long as it has. I believe that ORSN has a very energetic leadership, headed by Professor Sunity. The activities that it has undertaken, for a society that is composed of only 50 members, is indeed impressive. I am confident that ORSN will grow to be a very successful promoter of OR in Nepal.

TRN- What benefits can be derived from organizing conferences, such as the one being undertaken by ORSN?

Elise- Apart from the professional development of practitioners through the sharing among OR workers within and outside of Nepal that happens during the conference, the event is a very good way of marketing of our discipline. This conference will certainly raise the consciousness of decision-makers in Nepal and get them into thinking how they can benefit from this discipline that carries so much promise.

Portugal Hosts the First ICORES

Carlos Luz <carlos.luz@estsetubal.ips.pt>

The first International Conference on Operations Research and Enterprise Systems (ICORES 2012) was held from February 4 to 6 at the Hotel Tivoli Marina Vilamoura, Algarve, Portugal. ICORES 2012 was organized by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC) and co-sponsored by the Portuguese national OR society, the Associação Portuguesa de Investigação Operacional (APDIO).

The Conference Program included oral presentations featuring full and short papers as well as posters, which were organized in two simultaneous tracks: "Methodologies and Technologies" and "Applications". Three plenary keynote lectures were given by internationally distinguished researchers Dominique de Werra (École Polytechnique Fédérale de Lausanne (EPFL), Michel Gendreau (École Polytechnique de Montréal) and Begoña Vitoriano (Complutense University of Madrid). IFORS President de Werra took the opportunity to acquaint the participants with IFORS and its activities, as he participated in the panel that discussed the role and the future of Operations Research.

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(From top left, clockwise) D. de Werra, C. Luz, M. Genrdreu, B.Vitoriano and J. Felipe deliver their talks. (Bottom left) Participants enthralled by the fado show at dinner.

>> ICORES 2012 involved many senior researchers as well as young students. As customary in conferences organized by INSTICC, the closing session recognized outstanding work presented during the conference. The Technologies and Methodologies track and the Applications track gave out two awards – one for best paper, and the other for best student paper.

Significantly, of the 150 paper submissions from 40 countries coming from all continents, only 56 papers were selected for oral presentation

Significantly, of the 150 paper submissions from 40 countries coming from all continents, only 56 papers were selected for oral presentation (21 full papers and 31 short papers) and 14 for poster presentation. The stringent double blind paper review performed by the Program Committee yielded full paper acceptance ratio of 14%, and total oral (full and short papers) acceptance ratio of 37%. All papers presented at this conference will be available at the SciTePress Digital Library.

The smooth execution of the technical program was matched by the well-thought out social programs organized by the ICORES team and its secretariat. The welcome cocktail in the afternoon of the first day of the conference, a dinner on the evening of February 5 and the farewell cocktail provided excellent opportunities to network from the start to the end of the conference.

The conference dinner took place at the "Pousada de Estói", which is set in the old 19th century Estói Palace, located 10 kilometers away from Faro, Algarve's capital city. The wonderful meal was accompanied by a truly unique Fado show, featuring World Heritage music that made a lasting impression among all participants. This part of the social program allowed the participants a close encounter with the Algarve region and Portuguese culture.

The very positive experiences created by the first edition brought on an expectation that its second edition in Barcelona in February 18 to 21 (details at http://www.icores.org) next year will continue to contribute to the development of OR by increasing the dissemination of high quality OR work on theory and applications, and by providing the venue to develop new contacts and collaborative projects within the international OR community.

International OR Luminaries Grace Peruvian Conference

María Alvarez <m_p_alvarez_r@yahoo.com>

IFORS President de Werra (fifth from left) pose with the conference organizers and leaders.

The Peruvian Society of Operations Research and Systems Analysis (SOPIOS) held the Third Peruvian Conference on Operations Research and Systems Analysis from November 17 to 19, 2011 in Lima, Peru. Organized by the Faculty of Science and Engineering of the Pontifical Catholic University of Peru, the conference attracted researchers from Brazil, Mexico, Colombia and Peru and featured 75 paper presentations.

Renowned researchers Dominique de Werra (Switzerland), Flavio Autran (Brazil), Charles Vincent (Indian) and Marcos Negreiros (Brazil) gave plenary lectures and four tutorials on the topics: tools for design of routes for garbage collection problems; introduction to chromatic scheduling; the TODIM method of behavioral multi-criteria decision analysis; real estate valuation through a Choquet-Sugeno Model; and data envelopment analysis with undesirable inputs/outputs. On the other hand, the tutorials tackled some problems of optimization in graphs; multicriteria decision analysis in managerial decision making; clustering problems and use of system clustering and Six Sigma. >>

The IFORS President shared a lot of insights and provided guidance to the development of the very young organization that is SOPIOS.

>> Professionals, academics and students from all over Peru, notably, Lima, Arequipa, Trujillo came to participate and learn from each other and from the experts invited to the conference. The conference was successful in bringing together not only practitioners and educators but also OR workers from various OR areas. The conference provided the venue to share experiences and update their knowledge of tools and methodologies. The three days of the conference proved instrumental in bringing to the fore the use of operations research to solve problems and its contributions in the public, private and academic sectors.

The meeting also provided the opportunity for the SOPIOS leaders to meet with the IFORS President Dominique de Werra. The IFORS President shared a lot of insights and provided guidance to the development of the very young organization that is SOPIOS. SOPIOS was accepted into IFORS only in 2010. The fourth COPIOS will be organized at the northern part of Peru with details to be announced at a later time.

Top: Participants at the Peru Meeting

Bottom: OR teachers take a breather during the conference.

IFORS Sponsors OR School in Africa

Adam Ouorou <adam.ouorou@orange.com> and **Joel Tossa** <joel.tossa@imsp-uac.org>

With the objective of developing OR in Africa, a School of Operations Research was held from November 14 to 19, 2011 at Porto-Novo in Benin. The activity was supported by IFORS in cooperation with EURO, the French OR society ROADEF and France Telecom Orange Group. The school was patterned after the on-going ELAVIO organized schools in Latin America which had been reaping success for some years now. The school was designed for participants to discover practical aspects of applied mathematics and show how OR can contribute in optimizing resources in African countries. The school was open to all African graduate(master and Ph. D) students and teachers in mathematics and computers science. Nearly forty students and researchers from Benin, Burundi, Cameroon, Guinea, Ivory Coast, Mali, Niger and Nigeria attended the school.

Adequately covered by television (Golfe TV) and local press (newspapers "L'Informateur" and "La Tribune de la Capitale", the opening ceremonies was held on November 14, with remarks from the Director of the Institute of Mathematical and Physical Sciences (IMSP) at the University of Abomey Calavi (UAC), Joel Tossa followed by Celso Ribeiro who introduced IFORS and the ELAVIO program.

Three 6-hour main lectures were delivered as follows:

- Combinatorial optimization by Celso Ribeiro of the Federal University of Fluminense, Brazil;
- Decomposition methods by Philippe Mahey of ISIMA, Clemont-Ferrand, France; and
- Applications of Metaheuristics in Telecommunications by Simone de Lima Martins of the Federal University of Fluminense, Brazil.

Shorter lectures were delivered on the following topics:

- Global optimization by Babacar Ndiaye of Cheick Anta Diop University, Dakar, Senegal;
- Operations research in telecommunications by Adam Ouorou of Orange Labs, France; and
- Linear Programming by Mustapha Sanni of the University of Abomey-Calavi, Benin.

All the above lectures culminated with case studies. The program ended with a presentation on Network stability by Bertrand Tchantcho of the University of Cameroon and a talk on "Communities detection" by Mikaila Toko-Worou, a PhD student at Orange Labs.

Throughout the program, short breaks gave the participants the opportunity to share experiences and strengthen ties among themselves.

At the meeting held on November 18, all participants expressed gratitude for this initiative with they hoped, will be sustained and be instrumental in developing OR in Africa. Along this line, all welcomed the announcement of the establishment of a master's course in Operations Research at the University of Abomey-Calavi. Equally well-received was the announcement that a Master of Science in Operations Research is being set up at University of Benin

Joel Tossa and Adam Ouorou designed the scientific program. The local organizing committee headed by Joel Tossa was composed of Aboubacar Marcos, Liamidi Leadi, Guy Degla and Mustapha Sanni from the University of Abomey-Calavi.

IFORS Selects Scholar for the EURO Summer Institute

IFORS Vice President for EURO Elena Fernández announced that applications for the IFORS-EURO scholarship for the ESI Summer Institute are being processed and that the selected candidate will be notified by April. ESI 2012 on Cutting and Packing will be held in Porto, Portugal July 16 – 27, 2012. The Euro Summer and Winter Institutes (ESWI) are organized to encourage good social and working relationships among promising young OR scientists in Europe.

The selected IFORS- EURO scholars will receive joint sponsorship from IFORS and EURO. IFORS will sponsor the travel costs while EURO will take care of the expenses related to registration, accommodation, meals, and social activities to the two IFORS fellows.

The aim of the EURO Summer Institute on Cutting and Packing (ESI-CP) is bringing together young researchers with academic experts in the field. Every participant will present an unpublished research paper on a topic from Cutting and Packing, which will be intensively discussed during workshop sessions of the ESI. In addition to these workshops, the Scientific Program will include tutorials on selected topics and invited surveys of recent and an outlook on future developments in the area of Cutting and Packing. An attractive social program will allow for meeting and socializing with other young researchers and established experts in the field.

Cutting and packing problems are hard combinatorial problems, which arise in the context of many real-world applications, both in industry and in services. In general, they require that "large objects" are to be divided into "small items" in such a way that waste is minimized. Problems of this kind may involve the cutting of paper rolls into narrower rolls in the paper industry, the cutting of large wooden boards into smaller rectangular panels in the furniture industry, the cutting of irregularly shaped components of garment from fabric rolls in the fashion industry, but also the packing boxes into containers or the loading boxes on pallets in logistics applications.

To learn more about the ESI 2012, please visit http://paginas.fe.up.pt/~esicup/tiki-read_article.php?articleId=62.

ALIO Summer School Scores Sixteenth Success

Luciana S. Buriol <buriol@gmail.com>

The Latin American Operations Research Summer School (XVI ELAVIO - Escuela Latinoamericana de Verano en Investigación Operativa was offered at Bento Gonçalves, Rio Grande do Sul, Brazil, from February 5 to 10, 2012. With 105 participants, the school was organized by Federal University of Rio Grande do Sul - UFRGS - (Informatics, Administration and Mathematics Institutes), Federal University of Santa Maria - UFSM, and Federal University of Pampa - UNIPAMPA.The ELAVIO schools are promoted by the Sociedad Latinoamericana de Investigación Operativa (ALIO) to foster discussions on foundational, interdisciplinary, and applied topics related to Operations Research.

Historically, young Latin American researchers and M.Sc. and Ph.D. students, along with a few representatives from Europe, North America and emerging countries, attend the ELAVIOs. The main topics of this ELAVIO school are: Linear Programming; Mixed Integer Programming; Non-linear Programming; Metaheuristics; Graph Optimization; and Applications. Courses were offered in English, Spanish and Portuguese.

ELAVIO XVI was organized with six two to three hour tutorials and six hour-long talks from ten different researchers. The parallel sessions featured 59 student presentations of 15 minutes each. Apart from talks and tutorials, discussion groups were organized, where the students were divided into groups that ensured a good mix of nationalities. Here, the groups discussed how OR can be put to use to help a country prepare for the World Cup, and how models and solutions can remain after the World Cup. >>

Apart from talks and tutorials, discussion groups were organized, where the students were divided into groups that ensured a good mix of nationalities. Here, the groups discussed how OR can be put to use to help a country prepare for the World Cup, and how models and solutions can remain after the World Cup.

>> The student found this activity fun and allowed the participants to get to know each other from the first day of the school. A half-day tour was organized to visit three wineries in the region. The summer school was located in the Brazilian wine valley, after all.

IFORS ALIO VP Nair Abreu was on hand to welcome the participants, who numbered 105, including 80 selected students and 10 speakers. Applicants numbered more than twice the number of slots for the Summer School. Those accepted were offered full or partial scholarships. Of the 80 students, one is a post doctoral, 30 Ph.D., 35 master and 14 undergraduate students. The student participants were from 14 different countries, and around 20% were women. Selection of the scholars fell on the lap of the Scientific Committee which is composed of 24 researchers from 14 countries. They ranked the applicants after going through the submitted materials - extended abstracts, recommendation letters and the CVs of the applicants.

The aims of the ELAVIO school are: to present the fundamental scientific and mathematical principles of Operations Research to scholars, young and senior researchers; to present state-of-the-art research topics to graduate students and recent Ph.D. graduates from Latin America; and to provide opportunities to establish long term cooperation among young and senior operations researchers.

Based on the feedback, these goals had, as in the past Schools, been achieved. The success of the 16th School owes much to the Organizing Committee, along with the speakers and invited researchers: Carlile Lavor - Universidade Estadual de Campinas, Brazil; Carlos Hoppen - Universidade Federal do Rio Grande do Sul, Brazil; Celso da Cruz C. Ribeiro, Universidade Federal Fluminense, Brazil; Cristóbal Miralles, Universidad Politécnica de Valencia, Spain; Felix Moura-Camino - Air Transportation Department, ENAC, Toulouse; Guilherme Liberali, Erasmus University Rotterdam, Holland; Marcus Vinicius Soledade Poggi de Aragão, PUC-RJ, Brazil; Mauricio G.C. Resende, AT&T Labs Research, USA; Marcela Cecilia Gonzalez Araya, Universidad de Talca, Chile; and Reinaldo Morabito Neto, Universidade Federal de São Carlos, Brazil.

A Different Kind of A Summer School

Jane Kuhuk <jnkuhuk@gmail.com>, **Kate Pereverza** <pereverza.kate@gmail.com>, **Bogdan Pukalskyy** <bogdanpukalskyy@gmail.com>, **Maryna Dushenok** <marynadushenok@gmail.com>, **Gerhard-Wilhelm Weber** <gweber@metu.edu.tr>

The real world calls for professionals who have the ability to explore problems from different points of view and generate a lot of creative ideas. Participating in educational activities outside the classroom provides such an opportunity. One such educational activity is the "Achievements and Applications of Contemporary Informatics, Mathematics and Physics" (AACIMP) Summer School.

AACIMP is an international project organized by students of NTUU Kyiv Polytechnic Institute in Kyiv, Ukraine. Its main goals are to increase the integration of Ukraine into the international educational community and to link Ukrainian with foreign students and young researchers. From last year when Operations Research was first included as a stream (see IFORS News, September 2011 issue page 5), OR has become an important component of the 2012 Summer School program, with many fields of OR covered, including modeling, optimization and data analysis. Along with Operations Research, Neuroscience, Advanced Energy and Mobile Software Development will be featured in streams, with each stream taking 50 hours. Lectures, seminars and workshops delivered by prominent scientists from all over the world will be featured in each stream.>>

What sets the AACIMP apart from other summer schools is that it was started by student volunteers. These volunteers looked at this as an opportunity to bring technical expertise into the country, convey to foreigners the "taste" and "spirit" of Ukraine, and learn from the interactions.

>> What sets the AACIMP apart from other summer schools is that it was started by student volunteers. These volunteers looked at this as an opportunity to bring technical expertise into the country, convey to foreigners the "taste" and "spirit" of Ukraine, and learn from the interactions. The goals have given them great motivation and energy for organizing the events while providing superb hospitality for the participants. It has, thus far, been a hugely successful undertaking. In 2011, nearly a hundred masteral and PhD students as well as young researchers (half from foreign countries -USA, Russia, Poland, Germany and Iran) were guided by 48 tutors coming from all over the world.

Organized by the young people, the activity emphasizes not only technical but also personal learning. The diversified scientific program comes hand in hand with a highly interesting and memorable social program that promotes camaraderie among the participants during and after the school. Participants maintain ties through Facebook http://www.facebook.com/aacimp. The development and success of the project was greatly influenced by Prof. Gerhard-Wilhelm Weber who had this to say about the 2011 AACIMP, "Attending the Summer School in beautiful Kyiv is a unique experience which could be enjoyed every year! Though I have attended many such activities, never have I seen as vibrant and dynamic a program as that organized by these very young enthusiastic students. This conference series definitely serves as an inspiration and a model to those wishing to embark on similar programs around the world!"

For those wishing to know more about AACIMP 2012 to be held August 3 to 16, please visit http://summerschool.ssa.org.ua/.

The Global Practice Survey – Next Steps

John Ranyard <jranyard@cix.co.uk>

The IFORS statutes require IFORS to support OR practice and the survey results, together with the country presentations at the Melbourne conference, indicate that more could be done. In the final report (**now available at http://ifors.org/OR_Practice_Survey/**), a number of suggestions were made about how IFORS might stimulate and engage more with practice.

Suggestions for Supporting OR Practice and OR Practitioners

a) Stimulating many of the individual country OR Societies to identify - and engage more with - practitioners. It is clear from the survey that many IFORS (country) Representatives have little awareness of practice and limited contact with practitioners. This requires further investigation and an initial step could be to select two countries, with apparently weak practice links, with the aim of identifying the barriers that currently exist. One possibility would be the host country for a triennial conference – see below.

b) Promoting high profile OR practice streams at IFORS conferences, based on practice in the host country and supported by organisations with successful OR groups. It is well known that few practitioners are able to attend international conferences in other countries. However, at the last two triennial conferences (Melbourne and Johannesburg) home-based practitioners did attend and support the OR practice streams. This should be continued at Barcelona 2014 but would benefit from a local organiser (with support from the host OR Society) to help to identify potential delegates and to stimulate papers. It is doubtful that many practitioners would be persuaded to attend the full conference, so, as at Melbourne, one or two day attendance should be offered.

c) Ensuring that practice-based plenary talks are included in IFORS conferences. One possibility here is to invite a senior client of OR from a local company, ideally the CEO, to talk about the value of OR to her company. Again someone with local knowledge would be needed to find out which major companies use OR and the host OR Society should also be involved.

d) Publicising successful OR projects, that have made an impact on client organisations, in the IFORS Newsletter. Both the USA and UK have much case study material available as part of their 'Science of Better' initiative (which is aimed at selling OR to Chief Executives), some of which is based in other countries. All country OR Societies could be invited to submit material. Given sufficient support, an IFORS practice publication could follow.

It is clear from the survey that many IFORS (country) Representatives have little awareness of practice and limited contact with practitioners.

In order to promote such initiatives, it would help if a senior member of the IFORS Executive took direct responsibility for stimulating and supporting OR practice. It might also help if some young practitioners are involved, since new technology could help, particularly some of the business and social networking developments, such as LinkedIn and Twitter.

Report from the President

Dominique de Werra <dominique.dewerra@epfl.ch>

2011 was the second annual term of the present Administrative Committee (AC). With the learning phase over, the AC members organized various programs according to the priorities earlier identified. These are contained in their reports that follow.

This year's highlight is IFORS 2011 - the IFORS Triennial Conference held in Melbourne and organized by the Australian OR Society. The IFORS News has already reported on this remarkable event, which was a complete success, both scientifically and socially. In spite of the location that was found relatively inaccessible by many regular conference participants, the attendance was surprisingly high. We reiterate our deep gratitude to Patrick Tobin, head of the Organizing Committee, and to Janny Leung, head of the Program Committee, for the excellent work they have accomplished for IFORS. One of the highlights of the Conference was the plenary lecture of Sir James Mirrlees, 1996 Nobel Prize in Economics, who fascinated the audience and raised many questions from the public about optimal taxation.

Every triennial conference benefits from the experience of the conferences before it. This event, which numbers 19 in the series, definitely learned from the lessons of the past. We look forward and express our best wishes to the next organizers, in particular, Elena Fernandez who heads the local organizing committee for IFORS 2014 in Barcelona and who is currently IFORS Vice President representing EURO.

A Federation is a living body that grows old. But unlike human bodies, organizations never stop getting new members. In 2011, IFORS had the pleasure of welcoming two new member Societies, namely those of Estonia and Nepal.

As another living body, the AC had some changes this year: Martine Labbé who was Vice-President representing EURO had to resign owing to several other time consuming commitments (in particular as Editor-in-chief of one of the new European OR Journals); we take this opportunity to thank her for her activity on our AC as we congratulate her for the new appointment. We express our gratitude to Elena Fernandez who readily accepted the job of Vice President representing EURO, and along with this, that of VP in charge of Publications. She is assisted in this by Hugh Bradley who chairs the Publication Committee. From 2011 we can also count on the presence of Preston White as Editor of the IAOR (International Abstracts in O.R) while Celso Ribeiro is continuing as Editor of ITOR (International Transactions in O.R). We thank all of them for their active and successful involvement in these publications, which constitute a visible and essential part of the IFORS actions.

As announced earlier, communication is a domain on which the present AC has decided to put a high priority. One of the main tools in this area is the IFORS News and all of us who have followed closely the IFORS events have noticed that the newsletter and the website have now become informative, instructive and pleasant communication tools of which IFORS can be proud. Special thanks are due to Elise del Rosario for having so successfully developed these tools during these years.

In addition to all this you will discover in the following reports of the AC members that our Federation has continued its actions in other directions which are also having a high priority: education and developing countries. Several courses have been organized to present the bases of OR to "newcomers" and to teachers of some emerging countries.

As far as education is concerned, we think that it is important to include tutorials both in the conferences in which IFORS is involved and in the publications like the IFORS News.

This need arises because the field of OR is expanding fast and it often draws inspiration from other fields, e.g., life sciences, in its quest for effective optimization procedures or modeling techniques that can cope with increasingly complex systems occurring in technology, human sciences and nature. We express our gratitude to Nair Abreu for taking care of all our educational programs.

Thanks are due to Hugo Scolnik, Vice President at large, for his activity in setting up the programs related to developing countries. Thanks too to Karla Hoffman, who as in charge of meetings, has put in work years ahead to make sure that the IFORS events cover the whole world and that the presence of the Federation in regional meetings is felt through its tradition of Distinguished Lectures and the launching of the Invited Tutorials. Our thanks to her.

It is also well known that IFORS finances scholarships, which enable young researchers to network with experts and colleagues as they attend conferences and workshops. This is made possible in particular through the efforts of the IFORS Treasurer Peter Bell, a former IFORS President. He faithfully oversees financial transactions and has managed to keep us relatively insulated from the global financial turmoil.

While we want to achieve strong and close links among members, it is also essential to have direct connections between the AC of IFORS and its regional groupings. This is made possible through the Vice Presidents representing each region, who have maintained communication channels open and who have monitored for difficulties that may need IFORS attention and for best practices that deserve emulation.

We are therefore very grateful to the Vice-President Nair de Abreu (ALIO), Elena Fernandez (EURO), Karla Hoffman (NORAM) and Xiang-Sun Zhang (APORS) for being these remarkable liaison officers through whom IFORS can really develop its activities on a worldwide basis.

All these activities have to run with smoothness and a bit of continuity in spite of the fact that the AC members are changed every third year! This miracle may occur since, in addition to the treasurer who usually survives these changes, there is also an IFORS secretary who takes care of the daily operations of the Federation, including the education of new presidents and AC members. We cannot conclude this introduction without expressing to Mary Magrogan our thanks for helping us so nicely to serve IFORS in the best way.

Report from the Immediate Past President

Elise del Rosario <elise@JGdelRosario.com>

As Immediate Past President, I was tasked with providing guidance to the current Administrative Committee in order to ensure the continuity of programs started and to provide not only the context of decisions made in the past but also perspectives on current issues. I was also assigned to oversee an initiative started during my term as President, the Survey of OR practice. While I spent time giving inputs and contributing to the activities of the Developing Countries Committee, bulk of the activities I personally attended to involved overseeing the maintenance and further development of the IFORS website and acting as Editor of the IFORS News, two very important vehicles of IFORS communication. Highlights of activities carried out in 2011 are reported below.

IFORS News

For 2011, the quarterly electronic issues appeared on schedule. Alerts were sent to the national societies as soon as the issues were uploaded to the IFORS website. Apart from the electronic version, hardcopies of the March (containing marketing publicity for IFORS 2011) and June (IFORS 2010 Annual Report) issues were mailed to all members as well as distributed to the participants of IFORS 2011.

2011 saw three new things for IFORS News. In March, the IFORS News launched the OR for Development section edited by Arabinda Tripathy. A section on brief Tutorials was included in the December issue, covering Bioinformatics and Smart Markets. In time for the September issue, IFORS News applied for, and was granted the International Standard Serial Number (ISSN), an internationally recognized identification number for serial publications. The acquisition of ISSN was necessary for IFORS News to be recognized as a regular, easily identified unique publication, serious about its goal of being the medium of information exchange and sharing of activities among OR professionals all over the world.

Through its active IFORS News correspondents, Annibal Parracho (ALIO), Degang Liu (APORS) and Gerhardwilhem Weber (EURO) the year saw an enhanced coverage of conferences happening all over the world: Canada, Africa, Moscow, Turkey and China (March issue); Amsterdam, Kiev, Medan and St. Petersburg (September issue) and finally, Charlotte, Shandong, Zimbabwe, and Zurich (December issue).

As was the practice, the June issue was devoted to the 2010 Annual Report. Throughout the year, IFORS initiatives consisting of the IFORS Invited Tutorial, the web-based Educational Resources project, the IFORS- EURO Scholarship for the upcoming ESI 2012, the IFORS Survey of OR practice, the ITOR indexation by ISI, as well as the IFORS Prize for OR in Development finalists and papers were covered. Both the pre- IFORS 2011 publicity and the post conference accounts were written up in the issues.

Regular opinion columns by the IFORS AC, Heiner Muller Merbach, and book reviews by Hans Ittmann continued to appear, touching on opinions and books of interest that get reader reactions. Applications from around the world were likewise featured, including the use of OR in winery operations, in an archeological project, for disaster management, in Chinese national policy-setting, in reaching the MDG, and in the Japanese recovery from the earthquake disaster. As in the past, member societies were featured, to wit: the newly-accepted Estonia along with the IFORS 2014 host, the Spanish society, and, in the latest issue, the world's oldest at 63 years old, the UK OR society alongside the youngest IFORS member, the national society of Nepal, the last society accepted into IFORS in 2011.

For the above, the editor took charge of article collection and language editing while the layout is assigned to a graphic designer. In the same way that our discipline continues to evolve over time, the IFORS News is similarly evolving to find new and better ways to serve its community.

IFORS Website

Throughout 2011, the webmaster retained by IFORS kept pace with the evolving web technology in order to provide a website that is welcoming, easy to use, and conducive to sharing ideas and information among its members. Along this line, a feature is being added that will make it easier for social networking site users to share information contained in the website. The quality of information contained was kept current through daily monitoring and the necessary update of news, announcements and other information pertaining to IFORS, its members and other OR-related activities. Queries by website visitors were attended to and when necessary, forwarded to the appropriate individuals. Setting up the online voting for new issues and the necessary moderation and support for it were carried out.

The website provided support to the Education Committee through its Educational Resources section, which aims to make available to the IFORS website visitor links to materials on OR education that are in the internet. It is aimed at providing a means by which OR materials in various languages can be uploaded and hosted by the site. In 2011, the committee headed by Marcela Gonzalez Araya made available in the site OR Education materials in Spanish.

In support of the Developing Countries Committee activities, the IFORS Developing Countries OR Resources Website was launched during the year. The aim of the Developing Countries On-Line Resources page is to offer the OR worker all publicly available materials on the topic of Operations Research for Development. Headed by Gerhard-Wilhelm Weber, the initiative also aims to provide a venue for people who are working in the area to share their completed or in-process work, learn from others, and stimulate comments and discussions on the work. Materials were uploaded to the site during the year.

In response to new needs that arose, a new feature on Careers section was added and video uploading and viewing made possible.

Site activity monitoring showed a stable number of visitors. With the goal of increasing website traffic (which implies its usefulness to its members), 2012 plans include continuation of research into, as well as compilation and uploading of materials for, the Education and DC Resources sections. >>

>> Other plans include: redesign the site and improve the navigational structure; pick up and post news from national society member websites; provide tools that will enable visitors to read the IFORS News through their browsers; develop further the career section; and make the member society information easily accessible with the goal of making the website a convenient portal for visitors wishing to get information about the member societies.

Global Survey of OR Practice

IFORS commissioned a survey of OR practice in member countries, updating an earlier one carried out in 1996. Fourteen years on we know too little about OR in practice and the organizations which make good use of analytical methods. The aim of the survey is to gain a better understanding of the usage of quantitative tools, techniques and approaches and their impact on decision-making in organizations, as well as the background of the OR analysts involved. The results should enable IFORS to improve their support to and promotion of OR in member countries. John Ranyard was appointed project leader with support from Robert Fildes and Alastair Robertson. The project was completed in December with the results of the global OR practice survey presented at IFORS 2011, together with six individual country presentations (USA, UK, Philippines, Australia, New Zealand, and South Africa).

A summary report of the main results from the global survey and the key points from the country presentations, leading to suggestions on how IFORS might better support OR practice and OR practitioners was featured in the December 2011 issue of the IFORS News. The final report on the survey has been presented and a paper for ITOR based on the detailed survey results is being prepared.

Report from the Vice President

Hugo D. Scolnik <scolnik@fibertel.com.ar>

Developing Countries Initiatives

OR Schools

Consistent with its policy of promoting OR in developing countries, IFORS, together with EURO, the French OR Society (ROADEF) and the France Telecom Orange Group, sponsored an OR school in 2011 from November 14 to 19 at Porto Novo in Benin. It was organized according to the model of the ELAVIO schools in Latin America, which have been successfully conducted for many years now. The aim was to allow participants to discover practical aspects of applied mathematics and how OR can be helpful for the development of the African countries. Nearly forty students and researchers from Benin, Burundi, Cameroon, Guinea, Ivory Coast, Mali, Niger, Nigeria, and France (two native Benin Ph.D. students) attended the school.

The scientific program was established by Joel Tossa and Adam Ouorou and the local organizing committee headed by Joel Tossa was composed of Aboubacar Marcos, Liamidi Leadi, Guy Degla, and Mustapha Sanni from the University of Abomey-Calavi. Professor Celso Ribeiro from Brazil was also very active in promoting the idea of this school and gave a course on Combinatorial Optimization.

IFORS Prize for OR in Development

The Prize was awarded during the 19th Triennial conference on "Global Economy and Sustainable Environment" held in Melbourne, Australia from 10-15 July 2011.Professor Subash Datta was the Prize Chair, with the collaboration of Elise del Rosario, Celso Carneiro Ribeiro, Arjan Shahani, Theodor Stewart, Leroy White, and myself.

The judges were unanimous is selecting the eight finalists from the 22 entries that qualified.First prize certificate and prize money of USD 4000 was presented to Joao Neiva de Figueiredo and Miguel Angel Marca Barrientos for their paper titled "A Decision Support Methodology for Increasing School Efficiency in Bolivia's Low Income Communities". The paper used a DEA based DSS methodology for increasing School Efficiency with available scarce resources and sharing best practices across the network. The Runner-up prize certificate and prize money of USD 2000 was presented to Angel Luis Udias, David Rios Insua, Javier Cano and Hocine Fellag for their paper titled " Cost Efficient Equitable Water Distribution in Algeria: A Bi- Criteria Fair division Problem with Network Constraints". The paper addressed water distribution problem in Kabylia region, Algeria by using an ILP model to resolve the multi criteria decision problem in a cost-efficient manner.

International Conferences on OR for Development (ICORD)

Since 1992 IFORS has organized a series of ICORD Conferences approximately every three years. In an effort to enhance continuity and sustain interest in the field, IFORS is launching a program to conduct more frequent workshops in different regions. Such workshops must be devoted to a particular theme for OR in Development (ORD), such as health, food, poverty, etc. The next meeting will be the ICORD Workshop for 2012 in Tunisia, in October to be organized by Professor Honora Smith. These conferences have been very actively promoted by IFORS Past President Elise del Rosario.

Report from the Treasurer

Peter Bell <PBell@Ivey.ca>

The IFORS financial position continues to be strong. What follows is a summary of the unaudited results for 2011 (all numbers in US $).

2011 was an IFORS triennial conference year and with the aid of the conference revenues, IFORS made a cash surplus of almost $40,000. We saw strong revenues from our publications with IAOR and ITOR receipts totaling ($146,700) which was well above budget ($101,700). 2011 members' dues collections ($25,109) were also above budget resulting from continued diligent efforts by Mary Magrogan to collect past due accounts. IFORS' interest revenue continued to decline as the economic downturn reduced the interest rate we receive on our reserves: in 2008 we received interest of $27,280 but in 2011 this had declined to $2,344 even though IFORS' reserves have increased. When conference receipts are included, the net effect was that IFORS revenues ($249,000) were above the budgeted amount ($231,000).

2011 spending was up substantially ($208,000 vs. $164,000 in 2010) but in line with the 2011 budget ($204,000.) Much of the increased spending was costs associated with the conference (program committee, abstract processing system, and additional travel). Committee expenses, editorial expenses, and office and secretarial expenses were in line with the budget. We had budgeted for a surplus of $27,000 and achieved a cash surplus of $40,500 in 2011. This is a cash surplus and it should be noted that the conference committed IFORS to expenditures of $60,000 over three years for subscriptions to International Transactions in Operations Research which will be accrued against this surplus in the audited results.

The 2012 budget (approved by the IFORS AC in Melbourne) shows an operating loss of $40,000 although this negative bottom line has already been increased somewhat by additional editorial expenses and increased office expenses as a result of the new contract with INFORMS.

On balance, 2011 did not materially change IFORS financial strength. Our very conservative investment strategy with our reserves in US dollars has resulted in erosion of our asset base versus strong currencies (the Swiss franc) but gains against weak currencies (sterling). Prospects for the future are sound, particularly with the improved stability on the financial system over last year.

In view of the Society's financial position and prospects, no change in member society dues is recommended at this time.

IFORS Financials

	2011 Actual (Unaudited)	2010 Actual (Audited)
INCOME		
Member Society Dues	25,109.42	32,681
Royalities		
IAOR	91,354.28	120,958
ITOR	55,413.96	55,104
Interest	2,344.63	2,488
Triennial Conferences		
Australia 11	74,375.00	
TOTAL INCOME	***248,597***	***211,231***
EXPENSES		
Triennial Conferences		
Barcelona 14	1,044.70	
Activities		21,484
Administrative Committee	26,309.45	
Publications Committee		44,646
IAOR Editor	22,884.79	
ITOR Editor	21,879.22	
Scientific Activities & External Affairs		
IDL, Fellowships, & Grants	2,888.38	22,604
IFORS Website	5,414.80	
Education Committee	12,400.00	
External Affairs	4,179.61	
Meetings Committee		6,095
Program IFORS2011	16,096.01	
ITOR Subscriptions	28,100.00	14,050
IFORS Newsletter	6,539.91	4,676
Developing Countries Committee	16,119.03	3,462
General Business Operations		
Office & Secretary	40,392.74	42,713
Auditor	2,946.98	3,000
Banking	983.29	1,315
Exchange difference		(308)
TOTAL EXPENSES	**208,179**	**163,737**
OPERATING RESULT	***40,418***	***47,494***

Report from the Vice President for ALIO

Nair Maria Maia de Abreu <nairabreunovoa@gmail.com>

ALIO

As IFORS AC member representing the Asociación Latino-Iberoamericana de Investigación Operativa ALIO (2010-2012), I am pleased to report on 2011 OR activities, both completed and in progress, which occurred in South America.
Most of the 2011 activities involved preparations for two important 2012 conferences in Latin America, namely: the XVI ELAVIO, Escuela Latinoamericana de Verano en Investigación Operativa; and the XVI CLAIO, Congreso Latino- Iberoamericano de Investigación Operativa, both events numbering 16th in the series.

ELAVIO 2012, the Summer School of ALIO, will take place in Bento Gonçalves, a city in the wine region of Rio Grande do Sul, Brazil, on February, 6-10, 2012. The chairperson is Professor Luciana Buriol, Professor of the Federal University of Rio Grande do Sul. ELAVIO received 159 applications of which 70 were selected. Of those selected, 44 will receive full (accommodation and meals) and 26 partial financial support. Out of the 19 applicants for the IFORS Scholarship, Juan Carlos Figueroa Garcia, from Colombia received the award.

The CLAIO 2012, the main scientific event held by ALIO, will take place in Rio de Janeiro, on September 24-28, 2012 and it will be in honor of three very important Latin-American OR-researchers: Nelson Maculan (Brazil) Hugo Scolnik (Argentina) and Andres Weistraub (Chile), who will all be celebrating 70 years. At the same time as CLAIO, we have two other events: SBPO, the 43rd Brazilian Symposium of Operational Research, and the LIA-SGT Workshop (Latin-Iberoamerican on Graph Spectra), www.sobrapo.org.br/claiosbpo2012/. CLAIO will benefit from the IFORS programs and will feature the IFORS Distinguished Lecture (IDL) and IFORS Invited Tutorial (IIT).

Education Initiatives

Besides representing the ALIO in IFORS, I took on the responsibility for the Education Committee. As is known, the Educational Program of IFORS consisted of 3 distinct activities:

The main objective of the Young Scholars' Program is to encourage the organization of short Schools looking for young talent in ORMS. IFORS supports the following schools which are functioning very successfully: ELAVIO (Summer School for ALIO) and the EURO (the Winter School for Euro). This year, an important step was taken in this direction. The Vice President of IFORS, Professor Hugo Scolnik, lead the organization of an OR school in Africa.

The Educational Resources Website is a facility within the IFORS website where teachers and researchers can provide slides, papers, texts, and software that could be useful to teachers of Operational Research. In 2011, IFORS appointed the following members to compose the committee: Marcela Araya (chair), from Chile; Samuel Jurkiewicz (co-chair), from Brazil; James Cochran, from USA; Xiwen, from China, representing ORSC and also APORS and Willi Weber, from EURO. The committee members are responsible for evaluating materials submitted.

Workshop for Teachers

The workshop of teachers is an activity which has been happening successfully during regional meetings, thanks to the collaboration of James Cochran and Peter Bell.

Crash Course

Proposed in 2010, Crash Course in Decision Problems and Operational Research was an activity of which the main objectives are: to provide professionals from the education, mathematics, engineering and management fields with an overview of Operational Research; to disseminate the main techniques of Operations Research; and to emphasize its importance in the training of present and future professionals. IFORS intends to encourage experimental activities from the Crash Courses in emerging countries. For 2011, two such courses were held in Brazil: In February 2011, one was held in João Pessoa, a city in the northeast region of Brazil and taught by instructors Dr Laura Bahiense and Dr Samuel Jurkiewicz. Another one was held in Natal, June 6 through 9, 2011.

Although generally successful, the courses were difficult to sell to participants, most of whom are engineers or mathematics students who have finished their undergraduate courses who have little knowledge of OR. The second difficulty was the lack of funds for instructors travel to various points in Brazil. The major difficulty encountered was the limited number of competent instructors available to conduct the course.

Report from the Vice President for APORS

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APORS

Composed of the national societies of Australia, China, Hong Kong, India, Iran, Japan, Korea, Malaysia, Nepal, New Zealand, Philippines, and Singapore, APORS welcomed the opportunity to host the IFORS 2011 in Melbourne. The societies mentioned each held their national conferences during the year, even as the Council was discussing preparations for APORS 2012. The year 2011 also saw the acceptance of the Operations Research Society of Nepal as the newest APORS member. >>

>> The APORS Council meeting was held last July 12 at Melbourne during the IFORS2011. The main item on the agenda was APORS 2012 to be held on July 28 to 30 in Xi'an, China. The theme of APORS 2012 is "Innovation and Development". The Program Committee has set broad themes for this conference to allow OR/MS professionals and practitioners to share their knowledge, insights, and experience on theory, methodology and innovative applications of Operational Research and Management Science to those issues of sustainable development and other vital concerns to the global community. Another item discussed during the Council meeting was APORS 2015. An early bid to apply as the host was presented by the OR/MS Society of Malaysia. The Council meeting pushed to open a new APORS website, which has subsequently started by the newly elected secretary, Chang Won Lee of the Korean national society. Welcomed by the Council members, Nepal OR Society representative was invited to the Council meeting.

Parallel to the academic activities organized by APORS, several series conferences which cover different branches in OR/MS were held in the past year. The Fifth Sino-Japanese Optimization Meeting (SJOM) organized by the Pacific Optimization Research Activity Group (POP) was held in Beijing in September 2011. POP is an Internet-based group of researchers, aiming to promote optimization research activities in the Pacific region. The sixth International Conference on Queuing Theory and Network Applications (QTNA) was held in Seoul, Korea, in 2011. The conference covers all the key topics in queuing theory, network applications and other related areas and provides an in-depth representation of theory and practice in these areas. The International Symposium on Operations Research and its Application (ISORA, http://www.aporc.org/ISORA/) is a series conference co-sponsored by Asia-Pacific Operations Research Center (APORC) under APORS and the Chinese Academy of Sciences (CAS). In 2011, the 10th ISORA was held in Dunhuang, China last July. The next ISORA is scheduled for 2013

In recent years, study on emergency and disaster management has been a great concern by the OR people. There were some international conferences on this field organized by APORS members. Another interdisciplinary research of OR in biological science has also obtained attention in this area. In 2011, ORSC set up a chapter on computational systems biology, the Society of Computational Systems Biology (SCSB) within ORSC. SCSB has organized 5 international conferences. The 5th conference, 2011 IEEE International Conference on Systems Biology was held last summer.

Report from the Vice President for EURO

Elena Fernandez <e.fernandez@upc.edu>

EURO

The members of EURO, which are full members of IFORS, comprise 30 national Operations Research societies of countries located within or nearby Europe.

The President of EURO for 2011 and 2012 is Grazia Speranza from Italy. Other Executive Committee members are Gerhard Wäscher (Germany), José Fernando Oliveira (Portugal), Jesper Larsen (Denmark). The permanent treasurer is Marino Widmer (Switzerland) and the webmaster Bernard Fortz (Belgium). From January 1, 2012, Gerhard Wäscher, takes over as the EURO President, and Sally Brailsford (University of Southampton) as the next EURO VP.

In 2011, EURO launched three new journals. The EURO Journal on Transportation and Logistics was launched in July and the first issue is being completed with editor in Chief of is Michel Bierlaire, from École Polytecnique Fédérale de Lausanne. The Editor in Chief of The EURO Journal on Computational Optimization is Martine Labbé, from Université Libre de Bruxelles. The editorial board has been approved and the first issue is being prepared. The third journal is The EURO Journal on Decision Processes with Ahti Salo of the Aalto University School of Science as Editor in Chief.

The EURO conference is organized every year, except during the IFORS Triennial conference year. 2011 was an IFORS Conference year and EURO supported a series of smaller meetings. The XXVI EURO mini-Conference on "Intelligent Decision Making in Transportation/ Logistics – New Trends and Decisions", took place in September 2011, in Poznan (Poland). A EURO conference for young OR researchers ORP3 (Op. Res. Peripatetic Postgraduate Programme), was held in Cádiz (Spain) on September 13-17. The 7th ALIO-EURO workshops on Applied Combinatorial Optimization were held in Porto (Portugal) earlier, on May 4-6.

There are 28 working groups in EURO (EWGs) which cover different areas within OR. In 2011, a new working group was created on Vehicle Routing and Logistics Optimization (VeRoLog). The EWGs meet regularly during the EURO-k Conferences and, possibly, in other events, where they organize thematic streams of sessions. In addition, most of them organize regularly their own meetings supported by EURO. In 2011 the following EWG meetings took place:

- 73rd meeting of the EWG Multiple Criteria Decision Aiding, Corte (Corsica) April 14-16.
- 74th meeting of the EWG on Multiple Criteria Decision Aiding, Yverdon (Switzerland), Oct. 6-8.
- 37th meeting of the EWG Operational Research Applied to Health Services, Cardiff (Wales), Jul. 24-29.
- 19th meeting of the EWGLA Locational analysis, Nantes (France), Oct. 12-14.
- Sspring meeting of the EWG Financial Modelling, Beirut (Lebanon), May 5-7.
- Fall 2011 meeting of the EWG Financial Modelling, Helsinki, Nov. 25-27th.
- 24th meeting of the EWG Chapter on Combinatorial Optimization, Amsterdam, May 30- June 1. >>

• Meeting of the EWG Decision Support Systems, London June 23-24th.
• 14th meeting of the EWG Transportation, Poznan (Poland), Sept. 6-9.
• 9th meeting of the EWG Continuous Optimization (EUROPT), Ballarat (Australia), July 8-9, 2011.
• International Workshop of the EWG Experimental Economics, Graz (Austria) March.
• EU/MEeting 2011 of the EWG Metaheuristics Vienna, Feb. 21-22.
• 8th meeting of the EWG Special Interest Group on Cutting and Packing, Copenhagen, May 19-21.
• International Conference of the EWG Network Optimization Group, Hamburg (Germany), June 13-16.

Publications

As the VP of IFORS in charge of publications, I am pleased to report on ITOR and IAOR, the IFORS publications overseen by Hugh Bradley.

International Transactions in Operational Research (ITOR)

2011 was the year the International Transactions in Operational Research (ITOR) was selected for coverage in Thomson Reuter's products and services. Beginning with V.14 (1) 2009. ITOR will be indexed and abstracted in:

• Science Citation Index Expanded (also known as SciSearch)
• Journal Citation Reports/Science Edition
• Social Sciences Citation Index
• Journal Citation Reports/ Social Sciences Edition
• Current Contents/Social and Behavioral Sciences
• Current Contents/Engineering Computing and Technology

This success is a direct reflection of the work done by ITOR Editor Celso Carneiro Ribeiro with support by our publisher Wiley-Blackwell over the past five years.

International Abstracts in Operations Research (IAOR)

For the International Abstracts in Operations Research (IAOR), 2011 marked the completion of the major overhaul of the Editor's Workbench (EWB) system for processing abstracts, ushering in significant improvements in the efficiency of the editing process. An Associate Editor, N. Peter Whitehead, a Ph.D. Candidate in Systems and Information Engineering at the University of Virginia, was appointed in September to complete the Editorial Office. Through the efforts of IAOR Editor Preston White, Associate Editor Peter Whitehead, past Editor David Smith, and the cooperation of publisher Palgrave-Macmillan, delays in the publication schedule accumulated during the EWB overhaul were cleared and the final issue was completed before the end of the calendar year.

Report from the Vice President for NORAM

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NORAM

The two societies that make up NORAM (North America) The Canadian Operations Research Society (CORS) and the Institute of Operations Research and the Management Sciences (INFORMS) have been very active this past year.

CORS continues to provide its members with a variety of publications and services including its quarterly Bulletin, its journal, Information Systems and Operations Research (INFOR), a traveling speaker program, holding a yearly Graduate Student Conference and providing grants to attend teaching effectiveness workshops. In addition, CORS honors its members with a variety of awards. In 2011, John Edward Coffman (Columbia University) was awarded the Harold Larnder Prize for international distinction in operations research; Eldon A. Gunn (Dalhousie University) received the CORS Award of Merit, Thomas B. Morrison (Ausenco Sandwell), Thorn Walden (Canadian Energy Research Institute), and Saeed Zolfaghari (Ryerson University) each received the CORS Service Awards.

The 2011 CORS conference was held on 30 May- 1 June in Newfoundland. The 54th Annual conference of the Canadian Operational Research Society and the 10th International Conference on Multiple Objective Programming and Goal Programming (CORS/MOPGP'2012 will be held in Niagara Falls from 11-13 June, 2012. Professors Saif Benjaafara (University of Minnesota), George Nemhauser (Georgia Institute of Technology) and Carlos Romero (Technical University of Madrid) will be the plenary speakers.

The journal INFOR, has now combined the subjects of Information Systems and Operations Research with the aim to expand quantitative scientific approaches to management. The integration of these two subjects also enhances the applied orientation of INFOR, since IS concepts are used in the practical implementation of OR models.

INFORMS continues to expand its number and scope of activities. The INFORMS annual meeting was held in Charlotte, NC in November with over 4000 attendees. The conference included 5 plenary talks (Salah E. Elmaghraby, James E. Rogers, Keith Collins, Barry L Nelson and Susan D. DeVore). Yves Crama was the IFORS Distinguished Lecturer at this meeting and gave a talk on "Boolean Methods in Operations Research and Related Areas". A number of prestigious prizes were awarded at that meeting: The John von Neumann Theory Prize was awarded to Gerard P. Cornuejols (Carnegie Mellon University); The Lanchester Prize to David Easley and Jon M. Kleinberg (Cornell University); The George Danzig Dissertation Prize to John Turner (Carnegie Mellon University); The George E. Kimball Medal for distinguished service to Brenda L. Dietrich (IBM TJ Watson Research Center) and Stephen M. Robinson (University of Wisconsin-Madison); The George Nicholson student paper prize to Kuang Xu, (MIT); The INFORMS Expository Writing Prize to Ward Whitt (Columbia University); The INFORMS Prize for the continued use of OR throughout a corporation to the Sasol Corporation; The INFORMS Prize for the Teaching of OR/MS Practice to Jeffrey E. Kline (Naval Postgraduate School); and the Philip McCord Lectureship to William R. Pulleyblank (United States Military Academy); >>

>> The President's Prize to Kenneth R. Chelst (Wayne State University); The Cases and Teaching Prize to Anton Ovchinnikov and Samuel E. Bodily (University of Virginia); and The Doing Good with Good OR Student Award to Turgay Ayer (University of Wisconsin).

INFORMS will hold its annual conference on Business Analytics & Operations Research from 15-17 April in Huntington Beach, CA and its Annual meeting in Phoenix, NV from the 14-17 November. In addition, INFORMS is planning a summer 2012 meeting in Beijing in conjunction with the Operations Research Society of China. The chair for this meeting is Jian Chen from Tsinghua University. Other Society conferences include: the Organization Science Section Winter Conference (February), the Optimization Society Conference (February), the Telecommunications Section Conference (March), the Military Applications Society Conference (March), the Group Decision and Negotiation Conference (May), the MSOM Society Conference (June), the Revenue Management and Pricing Conference (June) and the Winter Simulation Conference (December).

INFORMS currently publishes 16 journals as well as a tutorial and book series. Other programs include a speakers program, a high-school teachers' program, and a doctoral colloquium and young practitioners workshop. INFORMS is divided into communities: currently there are 10 societies, 22 sections, 5 fora (interest groups that are neither discipline or geographical), and 31 regional groups. These entities hold their own meetings as well as substantially contribute to the content of the national meeting.

Conferences

IFORS held a very successful conference in Melbourne, Australia July10th – July 15, 2011. Patrick Tobin and his organizing committee worked hard to ensure that the facilities and events associated with this meeting were perfect. Janny Leung and her program committee of close to 100 ensured the success of this meeting through their tireless efforts to create a great program. With over 1000 registered delegates coming from 62 countries representing all continents, the conference had 60 streams and 21 parallel sessions. The plenaries included Nobel Laureate Sir James Mirrlees, IBM Fellow and Vice President in the IBM Research Divisions Brenda Dietrich and Fellow of Churchill College of Cambridge University Daniel Ralph. The social events included an excursion to one of two wildlife sanctuaries and a Gala Dinner event where the IFORS Prize for OR in Development was awarded. The ASOR medal for service to the Society was also awarded at this meeting to Patrick Tobin.

The next IFORS triennial meeting will take place in 2014 in Barcelona, Spain. It will be hosted by the Spanish Society of Statistics and Operations Research (SEIO). Elena Fernandez (Polytechnic University of Catalonia) is heading the organizing committee with Stefan Nickel (Karlsruhe Institute of Technology) serving as Program Chair. The process to determine the location and organizing committee for the 2017 IFORS meting has begun. Proposals were due December 31, 2011.

Distinguished Lecturer

The IFORS Distinguished Lecturer is a program to encourage international cooperation in OR and to recognize successful and influential OR researchers. The breadth of the presentations by this year's IDLs attests to the good health of our field. At the INFORMS meeting in Charlotte, NC, Yves Crama received this honor.

IFORS has changed its policy to allow IDL lectureships to take place in the same year as the IFORS meeting as long as the regional meeting does not take place within three months of the IFORS meeting.

Invited Tutorial

In 2011, the IFORS Administrative Committee initiated the IFORS Invited Tutorial (IIT), to be presented in plenary (or semi-plenary) sessions of the regional meetings of ALIO, APORS, EURO and NORAM. These tutorials, given by outstanding scholars, will present the fundamentals of emerging OR technologies, application areas or teaching approaches to a large diverse audience. The tutorials are geared toward non-specialists with the goal of inspiring and raising interest in pursuing these new ideas. We anticipate that there will be at least two such lectures in 2012.

Report from the Secretary

Mary Thomas Magrogan <secretary@ifors.org>

Administrative Matters

Member Societies

Two new societies were accepted into IFORS for 2011:

- The Estonian Operational Research Society (EstORS) on March 4, 2011, represented in IFORS by Peep Miidla.
- The Operational Research Society of Nepal (ORSN) on November 29, 2011 represented in IFORS by Sunity Shrestha.

The Mexican OR Society, after having been inactive for several years, has notified IFORS of its decision to withdraw from the IFORS membership.

In 2011 membership dues invoices were issued and payments were received on schedule, with the exception of a few outstanding invoices. Annual returns, as required by the IFORS Statutes, are submitted by member societies throughout the year due to variances in societies' election schedules. The Regional Vice Presidents on the Administrative Committee work closely with the Secretary to ensure all member societies pay their annual dues and submit their annual returns. A facility for accepting annual returns has been made available at the IFORS Website http://ifors.org/web/update-your-annual-return-2/

Board of Representatives Meeting

The Board of Representatives Meeting was held on 12 July 2011 during the IFORS Triennial Conference in Melbourne. Reports by the members of the Administrative Committee, Editors, and Committee Chairs were provided to the representatives. Minutes from the Board of Representatives meeting for approval by the membership can be found on the IFORS Website at http://ifors.org/web/minutes-of-general-meetings/.

Croatian Operational Research Society

V. Boljunčić <vbolj@efpu.hr> and **L. Neralić** <lneralic@efzg.hr>

The idea of establishing a national Croatian OR society was brought up by a group of OR professors at the Faculty of Economics Zagreb during the first Conference on Operational Research KOI'91 held in December 1991. Around 60 scientists, mathematicians, economists and engineers were present at this meeting. Thus was the Croatian Operational Research Society (CRORS) born on 21st March 1992 twenty years ago.

Croatian OR scientists from abroad played an important role in this process. Upon acceptance of the By-Laws by the membership, the composition of the Executive Council and the Supervisory Board and Court of Honor were finalized. Elected as President, Vice President and Secretary were L. Neralić, V.Vojvodić-Rosenzweig, and K. Šorić, respectively. The position of President has since been passed onto T. Hunjak, K. Šorić, V. Boljunčić, and Z. Babić , the latter being the current President.

CRORS was established with the objective of advancing OR methods and techniques and promoting real world applications, establishing professional standards for work in OR and improving the teaching of OR. Programs carried out by the society to attain these goals include organizing scientific meetings and conferences as well as sponsoring lectures. Particularly at its early stages, linking with other OR Societies through its membership in the EURO and IFORS, helped a lot in enriching its activities and network. CRORS became member of IFORS and EURO in 1994. Born at an OR conference, it was natural that CRORS was particularly active in organizing these conferences which have numbered 13 since the first one in 1991.

> Particularly at its early stages, linking with other OR Societies through its membership in the EURO and IFORS, helped a lot in enriching its activities and network.

In 1996, during the first International conference sponsored in Rab, CRORS agreed to alternate the location of the conference series with neighboring Slovenia (its Society was accepted into IFORS in 2007). Apart from the KOI conference series, CRORS has organized and sponsored two workshops for young OR researchers, a EURO working group meeting and two international conferences.

The number of attendees at these CRORS-organized conferences-varied from about 50 to more than 100.. With participants coming not only from European countries but also from the USA, Canada, Costa Rica, India, Iran, Mexico, South Africa, Philippines, Malaysia and Taiwan, the international nature of the Conferences has grown through the years. So far, the list of invited speakers have included: R. Burkard, H. Th. Jongen, S. Zlobec, V. Rupnik, J. Skorin-Kapov, D. Skorin-Kapov, L. Zadnik Stirn, U. Leopold-Wildburger, E. A. del Rosario, O. Stein, A. Tsoukias, R. D. Banker, A. Ben-Tal, C. Roucairol, J. Edmonds, P. Toth, R. Slowinski, and J. Jablonski. CRORS recognizes that these activities would not have been possible without the valuable help extended by others, specifically: the Austrian, Czech, Hungarian, Slovakian and Slovenian OR Societies. These societies, including CRORS, produce an official journal called the Central European Journal of Operations Research (CEJOR).

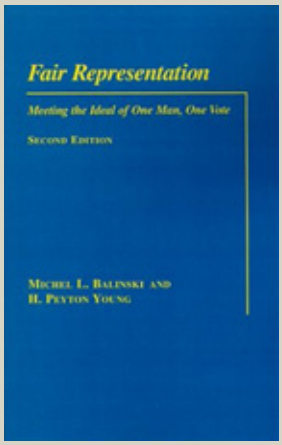
CRORS was recognized by IFORS during the Celebrating 50 years of IFORS ceremonies held at the XVIII Triennial Conference in Sandton, South Africa July 13 - 18, 2008. L. Neralić shown taking the certificate for CRORS from then IFORS President Elise del Rosario.

CRORS members are eager to welcome all member societies of IFORS to Croatia for the 14th International OR Conference to be held on September 26 – 28, 2012 in City Hall Trogir. Details can be found at the Conference website www.hdoi.hr/koi2012 or at the CRORS website, www.hdoi.hr.

Pictures highlight technical and cultural sharing during CRORS events.

The Mathematics Behind A Public Policy

Hans W Ittmann <hittmann01@gmail.com >



Fair Representation – Meeting the Ideal of One Man, One Vote by Michel L. Balinski and H. Peyton Young, 2001, Brookings Institute Press, Washington, D.C., USA, pp 195.
ISBN 0-8157-0090-3, 22.95 US dollars.

Reviewing a book that was published more than 10 years ago seems very strange. However, the topic is of interest since it concerns an issue that is both political and mathematical. The short article, titled "Fair Representation of Groups in Institutions" in the December 2011 IFORS newsletter by Heiner Müller-Merbach prompted this review. In addition, the reviewer has been involved in election forecasts for the past 13 years in a country where a proportional representation system was introduced at the dawn of the new democracy in 1994. The book Fair Representation is possibly one of the better and authoritative references on this topic.

The basic problem addressed is how to fairly divide the seats in a legislature of a country according to either the size of the population in a state, or province, or the number of votes received by a specific political party. In what seems to be a very simple and straight forward issue it turns out to be more complicated. The underlying problem is the fact that a perfectly fair division is not achievable because of the indivisibility of seats. This invariably leads to over-representation in some states and under-representation in others, making the ideal of one man one vote difficult to achieve.

The authors outline the aim of the book as being: "to establish a solid logical foundation for choosing among the available methods of apportioning power in representative systems. It is an example of mathematical reasoning applied to a problem of public policy. The style of analysis is similar to the axiomatic approach used in mathematics, where the object is to discover the logical consequences of certain general principles. The validity of the approach depends on identifying the right principles as revealed through history, political debate, and common sense."

The first half of the book covers the historical developments that led to various different methods used for apportionment since the establishment of the United States in 1776. It is a very detailed description on the history of how politicians developed different methods to suit changing circumstances. The USA example is rich with variations in this regard. The focus is entirely on electing members to the House of Representatives, one of the two chambers of the Congress of the USA. The other chamber is the Senate, where the US constitution stipulates very clearly that every State should be represented by two senators. For the House of Representative, the constitution states: "The Number of Representative shall not exceed one for every thirty Thousand, but each State shall have at least one Representative".

Over time as the population increased, it was obviously necessary to increase this number. However, it was decided, in 1911, to limit the number of representatives to the House to 435. The constitution also stipulated that a census will be held every ten years and the census numbers will then be used for the apportionment.

From the historical overview it is clear that ideally each state should have the same number of representatives per million people, but this is impossible to achieve exactly. Suppose, as is stipulated by the US constitution, one set a quota of one representative per 30,000 voters and find that a particular state should then get 1.6 representatives, should the state get 1 or 2? Another real example given in chapter 3 illustrates some of the difficulties of apportionment. Delaware and Massachusetts were two early states with populations of 55 ,540 and 475, 327 respectively in 1791. For this example the quota is the same as above, namely, 30 000 voters (the divisor). Through the resultant apportionment using the Jefferson method, Delaware got a quotient of 7.895 and Massachusetts 15.844 and ultimately each got 7 and 15 representatives respectively since fractions are thrown away. The question then is: Is this fair? Delaware gets one seat for 55 540 persons and Massachusetts one seat for 31 688 persons. This implies that every resident in Delaware has a 43% smaller share of representation in the House than a resident of Massachusetts. Surely this is not fair! Ignoring fractions tends to favour large states. Throughout the first part of the book, examples like these are used to illustrate the difficulties that arose over time.

> ...a solid logical foundation for choosing among the available methods of apportioning power in representative systems. It is an example of mathematical reasoning applied to a problem of public policy.

This all led, initially, to methods proposed by politicians such as Jefferson, Hamilton, Adams, Webster and Dean, plus a few others. In most cases the new methods came about because of a shift of one or two seats, small changes, but for politicians this was serious because it affected political power. Subsequently Hill and Huntington became involved, both trained mathematicians. In the end the question remains "so what method should be used?" There is no clear conclusive outcome. Balinski and Young describe in detail all the methods that have been advanced, and adopted, over the years. It is a fascinating historical account of endeavouring to reach for the ideal of one man, one vote where no man should have a greater voice than another! >>

>> In the end, the conclusion is that the current apportionment formula cheats the larger states in favour of the smaller ones contrary to the intentions of the founding fathers and compromising the "one man, one vote" rulings.

The second part of the book has two appendices. Appendix A is a comprehensive theoretical exposition and mathematical representation of the logic and arguments behind this problem area. The mathematics is rather challenging although the reader only requires some elementary algebra and probability theory as background. In this appendix, the text and methods are translated into and explained in mathematical form. Appendix B gives the results of the representative populations and apportionments for the twenty-two censuses from 1791 to 2000. In all cases, the apportionment using six different methods with different results, are given.

No mention is made in the book about other methods, or approaches, used elsewhere in the world such as, for example, the Single Transferable Vote method. This does not, however, detract from the value and insight obtained from Fair Representation.

The authors are able to show how something which literally requires simple arithmetic developed over time, capturing not only history and politics, but at the same time putting it across in mathematical terms. Finally one has to agree with the authors, quoting a representative in 1882 who declared (with pardonable exaggeration): "Since the world began there has been but one way of proportioning numbers, namely, by using a common divisor, by running the "remainders" into decimals, by taking fractions above .5 and dropping those below .5; nor can there be any other method. The process is purely arithmetical..... If a hundred men were being torn limb from limb, or a thousand babes were being crushed, this process would have no more feeling in the matter than would an iceberg; because the science of mathematics has no more bowels of mercy than has a cast-iron dog."

Psychophysics in Operations Research

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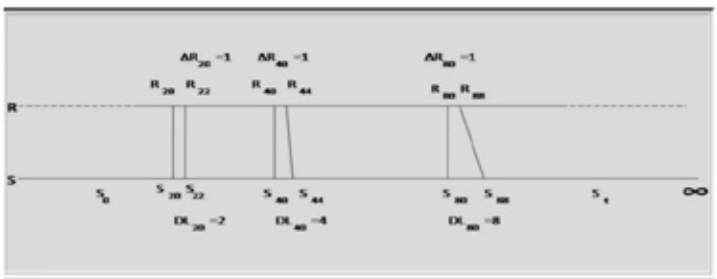
Operations Research is used to optimize resources, bringing maximum benefit or minimum cost. This can happen when the multidimensional attributes of a product is manipulated in a manner that maximizes profit or minimizes cost. The change is assumed to satisfy the customer. Does it? Customer satisfaction has two aspects: his comprehension of the change and how this comprehension translates into his decision to buy the product. For example, a toothpaste manufacturer adds a few more grams of the product into a standard size and advertises the additional quantity for the same price. However, the customer does not feel the change in weight with the result that the strategy does not affect his purchasing behavior. This is where Psychophysics comes in.

TERMS USED

Psychophysics is the science that investigates quantitative relationships between changes in physical events or attributes and changes in corresponding psychological events. Physical and psychological changes are each treated as a continuum i.e., closely graded series, one step merging imperceptibly into the next, the whole forming a straight line signifying changes in a single direction. Attributes refer to quality and quantity. Quality can be generic or specific. Looking at the picture of a car, one relies on the visual sense; when watching a car race, he uses both visual and auditory senses. Consumers want to comprehend different properties of the good, say, a car - the length, height and depth of variables in and outside of the car -before arriving at a purchase decision.

Psychophysics examines changes in product attributes relative to the subject's thresholds of perceiving the change. Subject refers to the consumer while threshold is the point at which there is an equal chance of perceiving or not perceiving the change. >>

Figure 1 Determination of stimulus threshold.



>> The three types of thresholds are absolute, differential and terminal. Figure 1 represents three thresholds on the physical (S) and psychological (R) continua. So indicates absolute threshold, DL indicates differential threshold and St indicates terminal threshold.

The very low intensity of stimulus administered to the subject at the start cannot be detected and is indicated by dashes (----------) on the Response scale. The gradual increase in the stimulus intensity level reaches the point of being detected by the subject. Absolute thresh- old is the point at which there is an equal chance for the subject to detect or not detect the presence of the stimulus On the other hand, terminal threshold is experienced when stimulus intensity is very high such that the subject fails to feel its presence. This is determined as the point at which the subject detects presence and absence of stimulus in equal number of trials. Differential threshold is the transition point where the subject has equal chance of detecting and not detecting the difference in stimulus attribute between a standard and the comparison stimulus.

DETERMINING THRESHOLD VALUES

Threshold values can be determined using three basic hit and miss methodologies.

Method of limits. This experimental design determines absolute and differential thresholds. Repeatedly presenting a series of fixed stimuli in ascending and descending orders and asking the subject if he or she can detect it determine the absolute threshold. A differential threshold is determined in the same way, except that the subject is asked to detect changes in intensity level of the stimuli with respect to a standard stimulus.

Table 1 shows different trials of stimulus presentation with varying intensity levels. Here 'D' denotes descending level and 'A' indicates ascending levels of presentation to the subject. First column shows a unit of the stimulus intensity. Intensity unit starts from 7 to 20 assuming the consumer cannot detect presence of stimulus at the lower stimulus intensity and can detect the presence of stimulus at the higher level. Y indicates detecting presence of stimulus and N indicates no detection of stimulus.

Table 1 Determining absolute threshold following minimal changes

Unit of intensity	D	A	D	A	D	A	D	A	D	A
20	Y		Y		Y		Y		Y	
19	Y		Y		Y		Y		Y	
18	Y		Y		Y		Y		Y	
17	Y		Y		Y		Y		Y	
16	Y	Y	Y		Y		Y		Y	
15	Y	N	Y	Y	Y	Y	Y		Y	Y
14	N	N	N	N	?	N	N	Y	?	N
13		N		N		N		N		N
12		N		N		N		N		N
11		N		N		N		N		N
10		N		N		N		N		N
9				N		N		N		N
8				N		N		N		N
7				N		N		N		N
	14.5	15.5	14.5	14.5	14.5	14.5	14.5	13.5	14.5	14.5

Mean=14.5; SD=0.47
D=Descending; A=Ascending; ? = Undecided

Stimulus intensity is set at 20 units initially. The subject fails to detect the presence of the stimulus when intensity unit is at 14. In the next trial, initial stimulus is set at 10 and increased gradually until the subject detects the stimulus at level 16. The transition point at each trial is averaged and absolute threshold is determined.

Table 2 shows research designs to determine differential threshold. Here, four symbols denote comparison with the standard stimuli: '+' indicates detection of higher intensity in comparison with standard one; '-' indicates detection of lower intensity; '=' indicates equal intensity; and '?' indicates that the subject is unsure. Standard stimulus here is 5 units. To understand the design, toothpaste weight can be assumed. Upper and lower transition points for each trial are estimated. Interval of uncertainty is estimated by the difference between average upper and lower transition points. Differential threshold is computed as half the interval of uncertainty. >>

Table 2 Determining differential threshold following minimal changes

	D	A	D	A	D	A	D	A
8	+	+	+	+	+	+	+	+
7	+	+	+	+	+	+	+	+
6	+	+	+	=	=	?	+	+
ST=5	=	?	-	+	+	+	?	?
4	=	-	-	-	-	=	+	+
3	-	-	-	-	-	-	=	=
2	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-
T+	5.5	5.5	5.5	6.5	6.5	4.5	5.5	5.5
T-	3.5	4.5	5.5	4.5	4.5	3.5	2.5	2.5

Mean T+=5.625, Mean T-=3.875
Interval of uncertainty=5.625-3.875=1.75
DL = difference threshold==(1.75/2)=0.87

> Customer satisfaction has two aspects: his comprehension of the change and how this comprehension translates into his decision to buy the product.

Frequency method. Method of limits brings in the errors of habituation and anticipation, which are avoided in this method because the stimuli are given in random order. Determining threshold value is more complex as it utilizes all the responses. Method of limits accounts for only the transition points. Second, it includes a lot of conversion as frequency of total transition zones are accounted for.

Average error. In this method, the subject is instructed to adjust a comparison stimulus until it appears equal to a given Standard. Here constant error is determined by subtracting the value of standard from the point of subjective equality or PSE.

The above methods fall into the category of hit and miss responses. Perceptible change in psychological scale corresponding to the change in physical scale indicates hit and absence of perceptible change indicates miss response. In product design, OR scientists should pay attention to frequency of hit and miss responses. 70% hit or 30% miss is acceptable for predictable changes. As opposed to the hit and miss response, the concept of scaling is also used, as exemplified by the method discussed next.

Feeling gradient. In this approach, the subject's feeling about the product attribute is examined through a rating scale. Numerical values are associated with continuous reasoning or judgment about product attributes. Figure 2 shows a subject's feeling gradient. The subject feels stimulus intensity with range from very high to very low. This feeling about the product determines propensity to buy the product. Estimation of feeling gradient is important for product innovation. It gives insight to OR scientists about exploring niche market, branding the product, determining product life cycle and product innovation besides optimization of product cost.

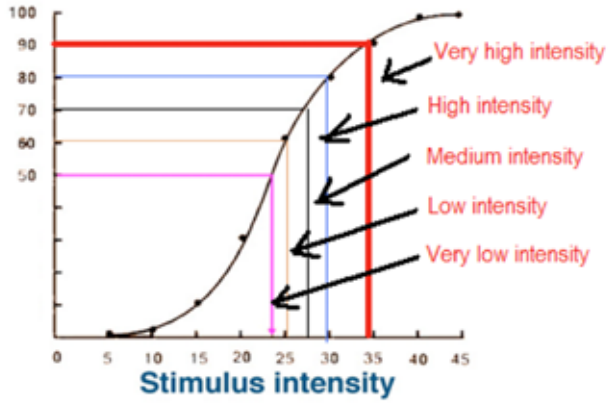


Figure 2. Gradient of feeling

To conclude, Psychophysics uses methodologies that provide a useful complement for operations research and cost optimization, especially where product changes and innovations are involved.

Operations Research in Abstract Art? Yes!

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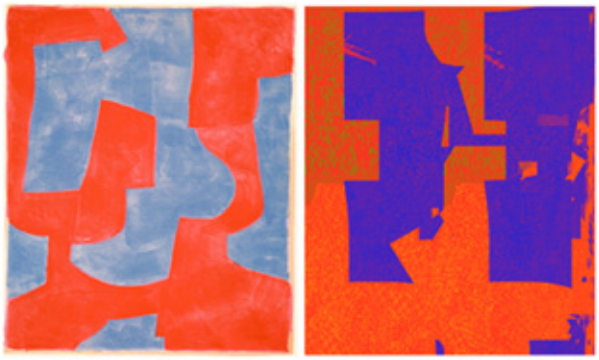
Operations research is not only a source of scientific and technological wealth but also a medium for visual creativity. Many OR topics such as simulation, decision-making, routing, clustering, and multidimensional scaling benefit from the use of different visualization techniques that help in understanding OR ideas and results. However, visualization in OR can expand into relatively new spheres, such as visual art.

Mathematical Origins of Art

Historically, mathematics provided a rich inspiration for visual art through its geometric shapes. Mathematics then became the creator of art through beautiful fractal paintings. These days, digital art is acknowledged as a full-fledged stream of art. Operations Research has enriched it by establishing a new style of mathematical painting – abstract determinism. The digital paintings in this style and other interesting OR images will be featured at a stream on OR and Art during the EURO XXV conference in Vilnius, Lithuania this July.

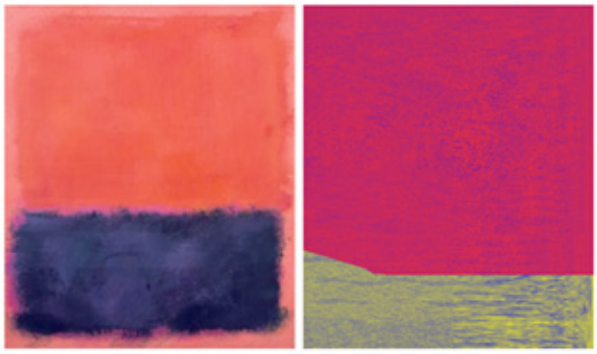
Abstract Determinism

Local optimization algorithms and deterministic chaos are the main tools of abstract determinism. "Abstract" refers to the lack of strongly pronounced connection with reality while "determinism" reflects the deterministic chaos origin of the painting. Similarities between works of abstract determinism and paintings made in the styles of abstract expressionism and naive primitivism abound. Pictures that follow show some works made by well-known painters alongside abstract determinism images. >>



Left – Serge Poliakoff, "Composition in blue and red", 1966. *Right* – "Red creek"

Left – Sophie Taeuber-Arp, "Flat curved profiles", 1959. *Right* – "Dissolving into the background"



Left – Mark Rothko, "Untitled", 1960-61. *Right* – "Dual code"

The Process

Every abstract determinism picture is created from visualizing the regions of attraction of all local minima of a multiextremal function. Multiple local optimizations are performed for this purpose, and the resulting image depends on the local optimization algorithm that was used. Different optimization algorithms result in different pictures: we can see an example on the right where a gradient algorithm gives a regular picture with simple, connected regions of attraction, while the simplex Nelder-Mead method produces much more chaotic results for the same function.

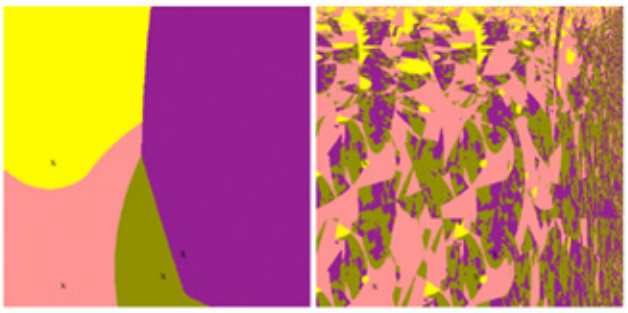
The Nelder-Mead algorithm is fully deterministic, with the starting point determining the unique point of convergence. Though it does not depend on a random choice of parameters, it behaves chaotically. Thus, a small change of the initial point leads the algorithm very far from the previous point of convergence. Deterministic chaos is an inherent feature of the Nelder-Mead algorithm.

Outcomes

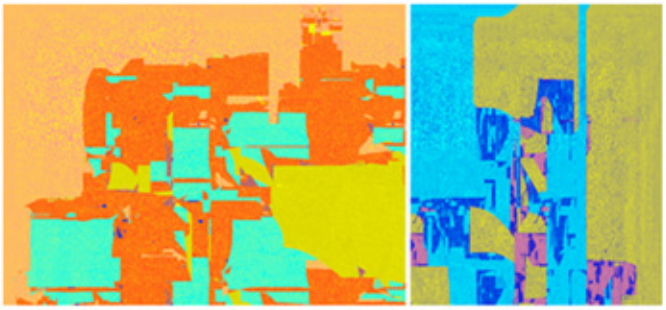
In many cases, abstract determinism pictures are color fields blasted by action: an original harmony of clear, regular color regions (like for a gradient method) is divided into small, interlacing pieces as a result of introducing chaos. Then new, beautiful harmony can be produced again amid the chaos. The combination of chaos and harmony, analysis and synthesis, splitting and merging – flowing into each other and then back again on their own – produces lovely images that are amenable to certain aesthetic and semantic interpretations.

How does one distinguish between an image created by a person and one generated by a computer? The famous Turing test, proposed in 1950, consisted of conducting a conversation with an invisible interlocutor in order to determine whether it is a person or a computer program.

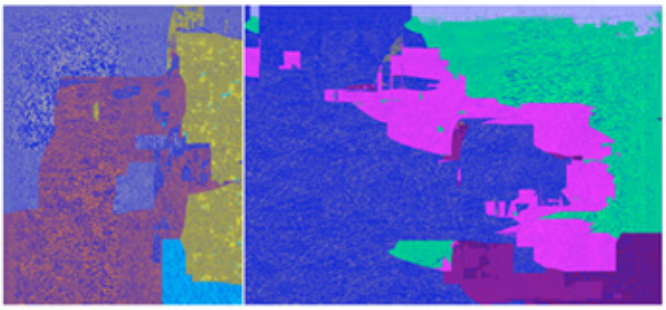
Abstract determinism creates a new, artificial reality. The images in its paintings are diverse and fantastic, seeming like images of animals, little people, or some creature, maps of unknown countries or just warm, soothing color schemes. Vitality and dynamism are inherent for even inanimate geometric figures. Paintings are imbued with inner tension and freedom, hidden pressure, challenge and an ominous readiness for self-destruction. Jittering and uncertain, the multi-layered instability of colors and transitions create excitement, provoke action, and raise expectations.



Regions of attraction for the same multiextremal function: *left* – a gradient algorithm, *right* – the Nelder-Mead one



"Construction of a new world"



Left – "For honey". *Right* – "Case of instability"

Left – "Warm colors". *Right* – "At depth"

Who Did it?

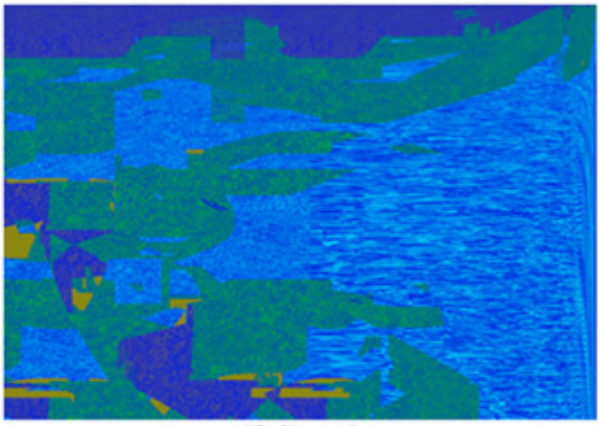
New images are produced by variations in the parameters of function models and optimization algorithms. Compared to fractal art, which is also based on a phenomenon of deterministic chaos, abstract determinism expands the creative possibilities of chaos by obscuring the mathematical origin of the paintings, thus confusing the issue of authorship. Even a discerning spectator will have difficulty determining who made them – a computer or an artist?

How does one distinguish between an image created by a person and one generated by a computer? The famous Turing test, proposed in 1950, consisted of conducting a conversation with an invisible interlocutor in order to determine whether it is a person or a computer program. The modified Turing test for digital art proposes to determine the authorship of images by their appearance, to answer the question of who did it – the computer or the artist?

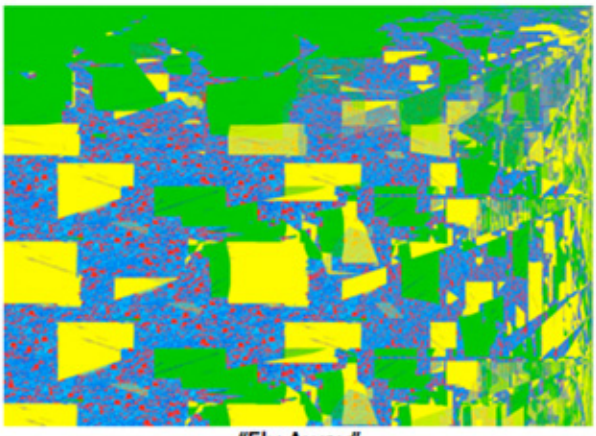
Contribution to Art

Far from implying that algorithms producing abstract art can replace artists, abstract determinism only serves to show that abstract art may either be the result of subjective imagination having real natural sources, or may be based on rigorous mathematical models and calculations. In the same way, pictorial art in the modern digital age cannot be considered as insufficiently meaningful only by the fact of its non-person origin.

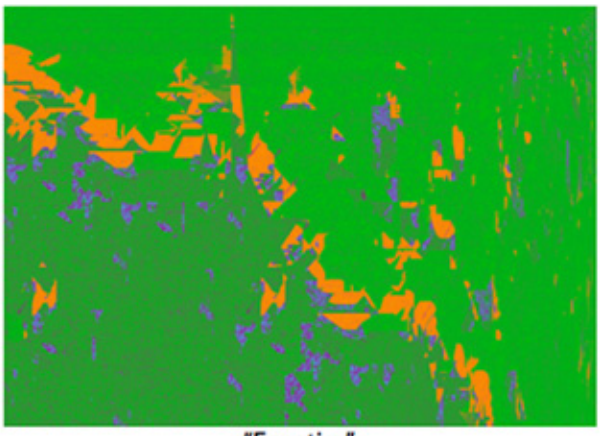
Paintings generated by the computer do not signal the death of abstract painting; rather, they provide additions to its treasures. Indeed, mathematics is not only the bearer of absolute truth about an abstract imaginary world, but can also be an equal partner in art, inspiring artists and feeding their creativity.



"Pelicans"



"Fly Away"



"Frontier"