

INFORMS OPTIMIZATION SOCIETY Business Meeting - October 14, 2012

Agenda

1. Optimization Society Conference (Jon Lee)
2. Secretary/Treasurer's report (Jim Luedtke)
3. OS Prizes (Jon Lee)
4. Election results (Jon Lee)
5. Discussion of an Optimization Society journal (Sanjay Mehrotra)
6. Other business

Optimization Society Conference

The 2012 OS Conference was held February 24-26, 2012; Coral Gables, Florida.

- Theme: "Optimization and Analytics: New Frontiers in Theory and Practice"
 - Website: <http://bus.miami.edu/ios>
 - Co-chairs: Anuj Mehrotra and Michael A. Trick
 - Organizing Committee: Edward Baker, Hari Natarajan, Tallys Yunes
 - Plenary Speakers: Jerald Ault (University of Miami), Dimitris Bertsimas (MIT), Manoj Saxena (IBM)
 - Features Talks: David Alderson, Suvrajeet Sen
 - 105 Regular talks, 8 poster presentations
 - Financials: Finished with a surplus of \$7300
 - Thanks to the organizers, host, sponsors, and speakers/attendees for a successful conference!
- Looking for proposals for 2014 OS Conference

- Preferably in a warm location, Jan/Feb 2014
- Contact Sanjay Mehrotra if interested

Secretary/Treasurer's report

Financials:

- 2008: Opening balance \$29,516; Ending balance \$34,156.
- 2009: Opening balance \$34,156; Ending balance \$38,830.
- 2010: Opening balance \$38,830; Ending balance \$50,165.
- 2011: Opening balance \$50,165; Ending balance \$51,685.
- 2012: Opening balance \$51,685; Dues revenue \$9660, net meeting revenue \$7,672.
- Even with 4 annual prizes, our balance has been steady.
- We now get charged credit card fees on transactions, although the amount is not that significant.
- In the last two years we have not been earning interest on our balance, because general interest rates are so low.
- The 2012 Optimization Society Conference had a surplus of \$7,300.
- Estimated end-year balance for 2012 ~\$59,600. Excluding the surplus from the conference, this would have been roughly equal to the beginning balance.

Membership:

- OS membership total membership increased by almost 200 this year, to 1082. It had been between 800 and 900, fluctuating slightly, for the previous 5 years.
- Most of the increase is attributed to an increase in student membership. Non-student membership was about the same as last year.
- Attendees were encouraged to renew/add Optimization Society membership; dues are used to pay for the prizes and hospitality at the business meetings.
- INFORMS recognizes several special interest groups within the Society; members are encouraged to indicate their interest in one or more of these areas when registering for the Society membership. This information will be of use to the Vice-Chairs, as they organize sponsored tracks at the annual meetings. Membership in interest different groups has been steady.

OS Prizes

- The Society awards four annual prizes.

- Webpage <http://www.informs.org/Community/Optimization-Society/Prizes> contains information on winners and nomination deadlines for future prizes.
- The prize winners presented their work and received the plaques and prizes at a special conference session sponsored by the OS on Monday, October 15, 2012.
- Below is the information on each award --- congratulations again to all the winners, and many thanks to all the prize committee members!

2012 Student Paper Prize

- Committee: Simge Küçükyavuz, Katya Scheinberg (Chair), Renata Sotirov.
- Winner: Diego Morán (Georgia Institute of Technology), for his paper "A Strong Dual for Conic Mixed-Integer Programs," SIAM Journal on Optimization, co-authored with Santanu S. Dey and Juan Pablo Vielma.
- Citation: Duality is a cornerstone of optimization theory and is often as essential for algorithmic developments as for theoretical foundations. While duality relations of linear and conic continuous optimization problems are well understood and are widely used, the duality in integer programming is much more elusive. However certain concepts carry over from linear programming duality to the linear mixed integer programming (MIP) case. The essential property that one seeks is the existence of a (subadditive) strong dual, that is a problem which is finite whenever the primal is finite and whose optimal value coincides with that of the primal when both problems have a finite solution. The dual is typically used in an algorithm to construct bounds on the optimal primal value. In the winning paper, Diego Morán and his co-authors develop a much anticipated strong dual for conic MIP. Even though the extension from LP duality to conic duality is well known, the MIP case is not straightforward. The authors establish a collection of results for conic mixed-integer problems that cleanly and elegantly lead to the existence of the subadditive strong dual under a simple condition. This paper clearly provides a significant step forward in the theory of mixed-integer nonlinear programming.

2012 Prize for Young Researchers

- Committee: Shabbir Ahmed, Alper Atamtürk, Endre Boros (Chair), Bob Vanderbei.
- Winner: Sergei Chubanov (the University of Siegen), for his paper "A strongly polynomial algorithm for linear systems having a binary solution", Mathematical Programming, Volume 134, Number 2 (2012), 533-570.
- Citation: Linear programming is fundamental in mathematical optimization, is widely used, and has had major impact on numerous branches of mathematics, engineering, and the sciences. An intriguing open end in the theory of linear programming is the existence of a strongly polynomial algorithm. The cited paper provides an important contribution to this open problem. The paper considers linear programs having a feasible region within the unit cube, and provides a strongly polynomial algorithm that solves such a linear program if it has a feasible binary solution, or proves that no such binary solution exists. Let us note that many linear programs arising, e.g., in combinatorial optimization have feasible binary solutions. The approach of the paper is a modification of a classical relaxation type method. The novel change is the introduction of projections on valid inequalities, constructed during the course of the algorithm. The idea of this approach can be extended to general linear programs, as well, leading to a new polynomial (though not necessarily strongly polynomial) algorithm for linear programming, presented in a companion paper.

The 2012 Farkas Prize for Mid-career Researchers

- Committee: Monique Laurent, David Shmoys (Chair), Laurence Wolsey, Yinyu Ye.
- Winner: Michel Goemans (MIT)
- Citation: Michel Goemans has made fundamental contributions to the design and analysis of algorithms for discrete optimization problems; furthermore, his work on approximation algorithms has introduced many of the essential tools in this area, including semidefinite programming as well as a more sophisticated use of polyhedral combinatorics.

The two most influential of his papers, both joint with his PhD student David Williamson, gave breakthrough results for the maximum cut and minimum-cost Steiner forest problems. The first work gave a .878-approximation algorithm for the maximum cut problem, breaking a long-standing barrier of .5; subsequent work has shown that, subject to the unique games conjecture, this is best possible provided that P is not equal to NP. Goemans's work introduced semidefinite programming as a tool in the design of approximation algorithms, thereby lifting the world of approximation algorithms from its focus on linear relaxations. Furthermore, it served as a catalyst in the development of algorithms for semidefinite programming as well as the further study of approximation algorithms based on embeddings in (geo)metric spaces.

Twenty-five years ago, it was widely believed that primal-dual techniques were of limited applicability in the domain of approximation algorithms. The second result of Goemans & Williamson mentioned above provided an elegant framework for capturing a wide swath of simple network design and connectivity problems, gave a simple, geometrically-inspired algorithm for computing good solutions, and then completed this work with an ingenious, but in retrospect transparent, analysis that the algorithm always delivers solutions of cost within a factor of two of optimal. Central to this achievement was the understanding of structural properties of the linear programming relaxation, which were then exploited in the remarkable analysis.

Goemans has consistently shown throughout his work that an in-depth understanding of polyhedral combinatorics can provide unexpected insights into the design of approximation algorithms. Nowhere is this more evident than in his relatively recent landmark achievement for the problem of computing a degree-bounded minimum spanning tree. Goemans gave an algorithm that finds a spanning tree of degree at most $B+2$, that is of cost no greater than the optimal cost of a spanning tree of degree at

most B. (Previous results found only near-optimal cost trees with a logarithmic number of additional edges per node.) This sparked an avalanche of papers on degree-bounded network design, both improving the B+2 to B+1, as well as generalizing the settings in which similar results could be obtained.

Finally, Goemans's recent result on the asymmetric traveling salesman problem (joint with Asadpour, Madry, Oveis Gharan, & Saberi) introduced a new suite of randomized rounding methods for the TSP, as well giving the first advance in 30 years by achieving an $O(\log n / \log \log n)$ performance guarantee. The ultimate impact of this breakthrough is not yet known: the methods introduced here might still lead to the first constant-factor approximation algorithm for the asymmetric TSP, as well as to the first algorithm to improve upon Christofides' classic result for the symmetric case.

Goemans's contributions are marked by his innate ability to give the elegant solution; in fact, his knack of finding the beautiful proof ("from the book") has led to a much deeper understanding of the work of many others as well. In summary, Michel Goemans is eminently deserving of the 2012 Farkas Prize awarded by the Optimization Society within the Institute for Operations Research and Management Science.

The 2012 Khachiyan Prize for Life-time Accomplishments in Optimization

- Committee: Kurt Anstreicher (Chair), Egon Balas, Claude Lemaréchal, Éva Tardos.
- Winner: András Prékopa (Rutgers University).
- Citation: András Prékopa was one of the pioneers of stochastic programming and has been a major contributor to its literature. In the 1960's, he amended one of the three basic model types of the discipline, chance-constrained programming, by taking into account stochastic dependence among the random variables involved. One of his main results in the area concerns the convexity theory of probabilistically constrained stochastic optimization problems. He introduced the concept of logarithmic concave measures and provided several fundamental theorems on logconcavity, which supplied proofs for the convexity of a wide class of probabilistically constrained stochastic programming problems. These results had impact far beyond the area of mathematical programming, as they found applications in physics, statistics, convex geometry and other fields. In addition to these theoretical developments, Prékopa gave the first algorithm, as well as several subsequent ones, for solving stochastic programs with probabilistic constraints. He also formulated models in this class for numerous real-world applications that he and his coworkers solved, often reaching interesting practical conclusions.

Professor Prékopa is the author of one of the major graduate textbooks on stochastic programming and has published more than 160 papers in scientific journals. In his long career he supervised over 50 doctoral dissertations, with many of his students going on to distinguished academic careers. Besides his work on stochastic programming, he has had an ongoing interest in the historical contributions of Hungarian mathematicians, including Bolyai and Farkas.

Professor Prékopa founded the Department of Operations Research at Eötvös University, Budapest and has been on the faculty of Rutgers University since 1985. He was the founder and first chair of the Committee on Stochastic Programming of the Mathematical Programming Society. His extensive professional service includes serving on many conference committees and journal boards. Professor Prékopa has been the recipient of numerous international awards, including membership in the Hungarian Academy of Sciences, being named a Fellow of the Econometric Society and receiving the EURO Gold Medal.

Election results

Continuing officers:

- Chair: Sanjay Mehrotra (Chair-elect 2011-2012; Chair 2012-2014; Most-recent past Chair 2014-2015)
- Most-recent past chair: Jon Lee (Chair 2010-2012, Most-recent past chair 2012-2013)
- Secretary/Treasurer: Jim Luedtke (2011-2013)
- Editors: Shabbir Ahmed (newsletter), Pietro Belotti (website)
- Vice chairs (2011-2013): Brian Borchers (Computational optimization/software), Santanu Dey (IP), Mohammad Oskoorouchi (LP and Complementarity), Baski Balasundaram (Networks)

Thanks to the officers finishing their terms:

- Vice-chairs (2010-2012): Oleg Prokopyev (Global optimization), Frank E. Curtis (Nonlinear programming), Huseyin Topaloglu (Stochastic programming)

Incoming officers

- Vice chairs (2012-2014): Leo Liberti (Global optimization), Andreas Waechter (Nonlinear programming), Andrew Schaefer (Stochastic programming)

Possible Optimization Society journal

- Sanjay Mehrotra led a discussion of the possibility of starting a new INFORMS journal to be sponsored by the Optimization Society
- Committee of past chairs has discussed this idea with Sanjay: John Birge, Nick Sahinidis, Tamas Terlaky

- All INFORMS societies larger than OS have an associated journal (MSOM, Transportation Science and Logistics, Decision Analysis) as do several others
- There is a question of where this journal would fit in the space of many other journals, although journals are still being started, and MPA and SIOPT have had very large submission growth in the last two years
- A business model would be needed:
 - E.g. Service Science
 - Costs: 10K startup cost, 45K annual operating cost.
 - Revenues: online subscriptions 15K, Institutions 16K, Consortia 12K, Advertising etc. 6K, Misc. 2K
 - Decision Analysis society subsidizes its journal
- INFORMS Pubs Position: Open to new ideas and experimentation (open access? author pay? sponsorships? online advertising? membership bundling?)
 - Would prefer "Analytics" to be part of the packaging
- An important motivation for the journal would be for it to have *very fast* paper turnaround (e.g., 4 weeks). This would be a good benefit for junior researchers, and might also help raise the status of our field if this leads to good "metrics" (like impact factor) for the journal relative to other fields.
- A committed team of leaders would be required to launch the new journal.
- A comment was made that a more specific proposal is needed before the membership can decide.
- We had a straw poll on whether or not the membership feels this idea is worth pursuing further, in order to create a concrete proposal that the membership could then vote on at a later date. The vast majority of the attendees supported this.
- The OS officers will create an online tool (like a blog or wiki) for collecting input from members, and facilitating further discussion.

Other Business

A question was raised about whether we should consider changing the names of the OS subgroups to replace the word "Programming" with "Optimization." E.g., Integer Programming -> Integer Optimization, Linear Programming and Complementarity -> Linear Optimization and Complementarity, Nonlinear Programming -> Nonlinear Optimization, Stochastic Programming -> Stochastic Optimization.

- The OS officers have discussed this in the past, but did not come to a consensus.
- There was not time for a discussion of this issue at the business meeting. OS members are encouraged to discuss and share their thoughts with the OS officers.

Thanks

Thanks to all of you for supporting the INFORMS Optimization Society. Society officers welcome any questions, suggestions and ideas related to the Optimization Society activities.

See you at the the next INFORMS Annual Meeting in Minneapolis, MN, in October 2013!

Jim Luedtke
Secretary/Treasurer