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# 8<sup>th</sup> EUROPT Workshop on Advances in Continuous Optimization

Aveiro, Portugal, July 9-10, 2010

## Final Report

The 8<sup>th</sup> EUROPT Workshop on Advances in Continuous Optimization was hosted by the University of Aveiro, Portugal. Workshop started with a Welcome Reception of the participants on July 8, followed by two working days, July 9 and July 10. This Workshop continued the line of the past EUROPT workshops. The first one was held in 2000 in Budapest, followed by the workshops in Rotterdam in 2001, Istanbul in 2003, Rhodes in 2004, Reykjavik in 2006, Prague in 2007, and Remagen in 2009. All these international workshops were organized by the EURO Working Group on Continuous Optimization (EUROPT; <http://www.iam.metu.edu.tr/EUROPT>) as a satellite meeting of the EURO Conferences. This time, the 8<sup>th</sup> EUROPT Workshop, was a satellite meeting before the EURO XXIV Conference in Lisbon, (<http://www.euro2010lisbon.org/>).

During the 8<sup>th</sup> EUROPT Workshop, the organizational duties were distributed between a Scientific Committee, an Organizing Committee, and a Local Committee.

- The Scientific Committee was composed by Marco Lopez (Chair), Universidad de Alicante; Domingos Cardoso, Universidade de Aveiro; Emilio Carrizosa, Universidad de Sevilla; Joaquim Judice, Universidade de Coimbra; Diethard Klatte, Universitat Zurich; Olga Kostyukova, Belarusian Academy of Sciences; Marco Locatelli, Università di Torino; Florian Potra, University of Maryland Baltimore County; Franz Rendl, Universitat Klagenfurt; Claudia Sagastizabal, CEPEL (Research Center for Electric Energy); Oliver Stein, Karlsruhe Institute of Technology; Georg Still, University of Twente.
- The Organizing Committee was composed by Domingos Cardoso (Chair), Universidade de Aveiro; Tatiana Tchemisova (co-Chair), Universidade de Aveiro; Miguel Anjos, University of Waterloo; Edite Fernandes, Universidade do Minho; Vicente Novo, UNED (Spain); Juan Parra, Universidad Miguel Hernández de Elche; Gerhard-Wilhelm Weber, Middle East Technical University.
- The Local Committee was composed by Paula Carvalho, João Pedro Cruz, Jorge Sá Esteves, Carlos Luz, Agnieszka Malinowska, Enide Andrade Martins, Antonio Pereira, Paula Rama.

The collaboration given by all the members of the Committees is highly appreciated. We are also very indebted to the sponsors. Namely, EURO (the Association of European Operational Research Societies), EUROPT (the Continuous Optimization Working Group of EURO), CIM (International Center for Mathematics, Portugal), APDIO (the Portuguese Operational Research Society), IAM (the Institute of Applied Mathematics of Middle East Technical University, Turkey), CIDMA (Center for Research and Development in Mathematics and Applications, which includes CEOC, University of Aveiro, Portugal), FLAD (the Luso-American Development Foundation), EOARD (the European Office of Aerospace Research & Development), Municipality of Aveiro, FCT (Fundação para a Ciência e a Tecnologia, Portugal), the DMat of UA (Mathematical Department of University of Aveiro) and Hotel Moliceiro. Due to support of EURO and the sponsors of the Workshop, the Organizing Committee managed to give a financial help to about 20 participants from weak currency countries in the form of fee waiving and partial support of accommodation and travel.

**The Scientific Program of the Workshop** started 9 of July, with the Opening Ceremony chaired by Prof. Domingos Cardoso, the Chair of the Workshop. The Presidium was composed by the Vice-Rector of UA for the scientific affairs, the Chair of DMat of UA, the Coordinator of CIDMA, the President of CIM, the Representative of APDIO, and the Chair of the Scientific Committee (and of EUROPT).

The Programm of the Workshop included two plenary talks "Direct Search for Single and Multiobjective Optimization" by Luís Nunes Vicente (University of Coimbra) and "Theory and Applications of Degeneracy in Cone Optimization" by Henry Wolkowicz (University of Waterloo); four semiplenary talks "A nasty cone with nice properties new issues in co-positive optimization" by Immanuel M. Bomze (University of Vienna), "Optimally Fitting Hyperplanes to Data" by Mirjam Dür (University of Groningen), "Risk averse stochastic programming" by Alexander Shapiro (Georgia Tech) and "Linear Optimization: Algorithms and Conjectures" by Tamás Terlaky (Lehigh University); a Special Lecture on Hirsh Conjecture entitled "A counter-example to the Hirsch conjecture" by Francisco Santos Leal (Universidad de Cantabria); and about eighty contributed talks, several of them were included in the following invited sessions: "Generalized differentiation and applications" organized by Vera Roshchina (University of Evora), "Vector and Set-Valued Optimization I and II" organized by Bienvenido Jiménez (UNED, Madrid) and Ruben Lopez (Universidad Catolica de la Santisima, Concepcion), "Nonlinear and nonsmooth optimization and applications (in memory of Prof. Mikhail Mikhalevich) organized by Tatiana Tchemisova (University of Aveiro) and Ludmilla Koshlai (Institute of Cybernetics, Kiev). The contributed talks were scheduled in four parallel sessions. The total number of the authors that presented their results during the Workshop was about 150, and at all the Workshop was attended by more than 120 participants from more than 20 countries. The five continents were represented during Workshop.

The 8<sup>th</sup> EUROPT workshop was a stage for the first public presentation of the refutation of the Hirsch conjecture by Francisco Santos Leal. This conjecture, formalized in 1957, from a question raised by Warren M. Hirsch (1918-2007) to George Dantzig (1914-2005) during a Conference (c.f. [1]), has several implications in the theory of polytopes and in linear optimization, in particular in the problem of existence of a simplex like polynomial algorithm for linear programming (a problem included in the list of open problems for the next century, proposed in 1998 by the prestigious mathematician Steve Smale in [2]). The Hirsch conjecture states that in a polytope of dimension  $d$ , with  $n$  facets (faces of dimension  $d - 1$ ), the combinatorial distance between any two vertices is not greater than  $n - d$ . Francisco Santos, has constructed a polytope of dimension 43, with 86 facets and diameter (combinatorial distance between two of the farthest vertices) not less than  $44(> 86 - 43 = 43)$ .

The topics of this Workshop were the following: applications of continuous optimization to combinatorial problems; complexity and efficiency of optimization algorithms; convex and nonsmooth optimization; complementarity and variational problems; derivative-free optimization; global optimization; linear and nonlinear optimization; optimal control; multiobjective optimization; robust optimization; semi-definite programming; semi-infinite programming; stochastic optimization; large-scale optimization.

### **10-th anniversary of EUROPT and EUROPT Awards**

2010 is a special year for EUROPT that celebrates its 10-th anniversary. On this occasion a small official ceremony was organized during the Conference Dinner in the Meliá Hotel. This ceremony was opened by the EUROPT Chair, prof. Marco López and the EUROPT past chair, Prof. *Gerhard-Wilhelm Weber*.

At the beginning, Prof. Weber has made a brief presentation of the 10-th year history of the Working Group, that was established with numerous founding members at a satellite meeting of the EURO XVII Conference in Budapest, July 16-19, 2000. In his talk, he has mentioned a lot of EUROPT members that

contributed to EUROPT, and kindly offered his personal gifts to some of them. In particular, Willy has honored and thanked the EUROPT chair Marco López for his work and contribution to EUROPT.

Prof. Marco López has announced the laureates of several special EUROPT designations and delivered the corresponding certificates. He also expressed his gratitude to the members of the Managing Board that worked hard during several years organizing a lot of EUROPT events and guaranteeing participation of EUROPT members in other important scientific meetings, and announced the members of the new Managing Board. Finally, the chair of the Workshop, Prof. Domingos Cardoso has thanked the Invited speakers of the Conference for their contributions, and offered them and some other EUROPT members the gifts from the Organizing Committee.



Marco López and Willy open the Conference Dinner



Marco López announces the EUROPT Fellow 2010

#### **Designation of the EUROPT Fellow 2010**

It became already a tradition of EUROPT Workshops that one of the most distinguished members of our Working Group is honored with a title of EUROPT Fellow. In 2010 according to the decision of the Managing Board, the title **EUROPT Fellow 2010** was attributed to Prof. *Yurii Nesterov* (Catholic University of Louvain, Belgium), for his extraordinary achievements. Prof. Marco López has presented to the laureate a certificate and honored him in a short speech.

#### **Designation of the EUROPT Honorary Chair**

In 2010, EUROPT celebrates a special date, its 10-th anniversary. During all these years, Prof. *Gerhard-Wilhelm Weber* (just Willy for all EUROPT members) has contributed a lot to all activity of our Working Group. For his permanent service to EUROPT, his initiatives, intensive dedication, encouragement and advice, EUROPT Managing board has decided to attribute to Prof. *Gerhard-Wilhelm Weber* the title of **Honorary Chair** of EUROPT.

#### **Social Program**

To complement the rich and intensive scientific program of the Workshop, the Organizers tried to offer the participants and their accompanying persons an interesting social program. This program consisted from Welcome Reception at the Aveiro City Hall on 8 of July (this kind of reception is usually called in Portugal "Porto de Honra", but in our case it was "Aveiro de Honra").

On the next day, after the long day of the work, the participants were invited to participate in the Conference Dinner at Meliá hotel, one of the best hotels of Aveiro. Since the hotel is situated just on the bank

of the Aveiro central channel, we started our way to the hotel by boat: on the board of the typical Aveiro boats "Miliceiro" the participants could enjoy a short excursion along the town channels and try a traditional dessert of Aveiro "Ovos Moles" (Soft Eggs) and a glass of sparkling wine.



During boat trip



Tuna Magna Cartola

To offer the participants a nice atmosphere during the Conference Dinner, we invited two groups of musicians to present their art. At the beginning of the Dinner we could listen some classic and jazz music played by trio of saxophone, guitar and bass-guitar (art director– João Figueiredo, <http://www.myspace.com/jfigueiredo>). And at the end, a student musical band from Aveiro University, Magna Tuna Cartola (<http://www.magnatunacartola.net/>), has presented to our guests a small concert, where they tried to explain what modern students like to do after (and sometimes) during classes. Finally, Tuna sang a song "Happy Birthday to you!", and Marco López, Mirjam Dür and Tamas Terlaky have putted out candles on birthday cake.

At the end of the day of the conference, 10 of July, after the Closing Session, we suggested the participants to take a Sight seeing excursion to Aveiro. Nevertheless it got to be unusually cold that day, we hope that everybody has enjoyed this excursion.



Anniversary cake



During Conference Dinner



### Next EUROPT Workshops

During the Closing Session of the Workshop it was announced that the next 9<sup>th</sup> EUROPT Workshop is planned to be held in July 2011 in Ballarat, Australia. This Workshop will be held just before the 19th Triennial Conference of the International Federation of Operational Research Societies "World OR: Global Economy and Sustainable Environment" in Melbourne, Australia (July 10 - 15, 2011). Prof. Adil Bagirov (the EUROPT fellow 2009) has kindly agreed to be the organizer of this event. It was also announced that the EUROPT Workshop of 2012 (Workshop-satellite of EURO XXV in Vilnius, Lithuania [www.euro-2010.lt](http://www.euro-2010.lt)) will be organized by Prof. Leonidas Sakalauskas and it will be held in Shauliaj, a town near Vilnius. Prof. Julius Zulinaskas made a brief presentation of Lithuania and Shauliaj.



Adil Bagirov presents next Workshop in Ballarat



Julius Zulinaskas presents Shauliaj

Some pictures of the Workshop are available in [www.europt2010.com](http://www.europt2010.com)

The organizers of the 8th EUROPT in Aveiro pass the baton to Adil Bagirov and his team in Ballarat, wishing them a fruitful work and success in organizing of the next Workshop in Ballarat. We hope that this event will bring us new opportunity to meet old and new friends from EUROPT, discuss the results of our work and just have nice time together.

*Domingos Cardoso and Tatiana Tchemisova*

### References

- [1] G. Dantzig, Linear Programming and Extension . Princeton University Press, Princeton, 1963.
- [2] S. Smale, Mathematical problems for the next century. The Mathematical Intelligencer, vol. 20, 2 (1998): 7-15.