

EURO

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EURO Excellence in Practice Award 2016

The winners of the 2016 EURO Excellence in Practice Award are:

Thorsten Koch, Benjamin Hiller, Marc E. Pfetsch, Lars Schewe, Dagmar Bargmann, Mirko Ebbens, Armin Fügenschuh, Björn Geißler, Ralf Gollmer, Uwe Gotzes, Christine Hayn, Nina Heinecke, Holger Heitsch, René Henrion, Jesco Humpola, Imke Joormann, Veronika Köhl, Thomas Lehmann, Ralf Lenz, Hernan Leóvey, Alexander Martin, Radoslava Mirkov, Andris Möller, Antonio Morsi, Antje Pelzer, Werner Römisch, Jessica Rövekamp, Martin Schmidt, Rüdiger Schultz, Robert Schwarz, Jonas Schweiger, Klaus Spreckelsen, Claudia Stangl, Marc C. Steinbach, Isabel Wegner-Specht, Bernhard M. Willert

Evaluating Gas Network Capacities

In 2009 Open Grid Europe (OGE, at that time E.ON Gastransport) Germany's largest Transmission System Operator (TSO) initiated the ForNe project (in German "Forschungskooperation Netzwerkooptimierung") due to the new challenging problems resulting from the liberalization of the gas market. Over decades, gas transport had been more or less steady state with long-term delivery contracts and weather forecast predictable demands. Now, demand and supply change on a daily basis and are triggered by market prices, not by security of supply. Nevertheless, a TSO like OGE has to guarantee the latter, having only little influence on the trading process. These facts result in enormously challenging problems simultaneously including uncertainties, dynamical aspects, and feasibility questions. Mathematically, these problems lead to stochastic mixed-integer non-linear non-convex optimization problems including PDE and ODE constraints.

The research part of the project run until 2015 and and it was necessary to bring together expertise in mixed-integer programming, non-linear programming, mixed-integer non-linear programming, stochastics, simulation, gas physics, network planning, law and regulations. The project involved about 40 people from OGE, five universities, and two research institutes. The whole team developed new mathematical models and methods, provided new theoretical insights into this kind of problems that lead to a completely new methodology for validating booked capacities, a task at the core of OGE's business operations. This cutting edge research was turned into a software system, bringing it directly into the workplace of the company. This software is now maintained and further developed by two university spin-offs working closely together with OGE's IT-department.

To the best of our knowledge, the ForNe project was for the first time able to solve real-world mixed-integer non-linear non-convex optimization problems with tens of thousands of binary and continuous variables. This is a break-through in computational mixed-integer non-linear programming and will have influence on many other areas where OR and engineering aspects come together. The results of this research project are documented in the book "Evaluating Gas Network Capacities" published in 2015 in the SIAM-MOS Series on Optimization, in nine PhD theses and several publications.



The EEPA 2016 jury consisted of Ton G. de Kok (chair), Ulrich Dorndorf, Erik Demeulemeester, Marco Laumanns, and Markus Böhlin.

The award was presented at the closing session of the EURO 2016 Conference in Poznań (Poland).

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EURO Award 2016

Hereby, EURO, the Association of the European Operational Research Societies within IFORS

certifies that the

EURO Excellence in Practice Award

was awarded to

Thorsten Koch, Benjamin Hiller, Marc E. Pfetsch, Lars Schewe, Dagmar Bargmann, Mirko Ebbers, Armin Fügenschuh, Björn Geißler, Ralf Gollmer, Uwe Gotzes, Christine Hayn, Nina Heinecke, Holger Heitsch, René Henrion, Jesco Humpola, Imke Joormann, Veronika Kuhl, Thomas Lehmann, Ralf Lenz, Hernan Leovey, Alexander Martin, Radoslava Mirkov, Andris Möller, Antonio Morsi, Antje Pelzer, Werner Romisch, Jessica Rovekamp, Martin Schmidt, Rüdiger Schultz, Robert Schwarz, Jonas Schweiger, Klaus Spreckelsen, Claudia Stangl, Marc C. Steinbach, Isabel Wegner-Specht, Bernhard M. Willert

Evaluating Gas Network Capacities

on 6th July 2016 at the 28th EURO Conference in Poznań, Poland

Jury: Ton G. de Kok (chair), Ulrich Dorndorf,
Erik Demeulemeester, Marco Laumanns, Markus Bohlin

EURO

The Association of European
Operational Research Societies

Prof. Elena Fernández, President