Modelling investment in energy markets: stochastic equilibrium problem defined on simulation model

Alexei A. Gaivoronski Zhonghua Su
Norwegian University of Science and Technology
Trondheim, Norway
Alexei.Gaivoronski@ntnu.no zhonghuz@ntnu.no

We develop simulation model of energy market where producers supply energy to a set of consumers. During each time period consumers decide the equilibrium amount of production and the optimal level of capacity expansion. The decision to expand capacity is based on predicted level of ROI (Return on Investment): if predicted ROI exceeds a given threshold then a producer proceeds with expansion. There is substantial uncertainty about future prices and other system parameters. The optimal values of ROI for each producer are computed by solving stochastic equilibrium problem defined on this simulation model using stochastic optimization solver implementing stochastic gradient methods gradient methods [1].

References

[1] A. A. Gaivoronski. SQG: Stochastic programming software environment. In S.W. Wallace and W.T. Ziemba, editors, *Applications of Stochastic Programming*. SIAM & MPS, 2005