ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Chance-constrained optimal control of a gas-to-power system

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Chaired by Michaela Hitz | Department of Statistics

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N.2.01

ABSTRACT

We are concerned with optimal control strategies subject to uncertain demands. Taking uncertainty into account becomes more and more important in many areas. In the context of the energy transition in Germany, a need for control strategies taking these uncertainties into account naturally arises. Deviations from the demand actually realized need to be compensated, which might be very costly and should be avoided. To this end, we consider different approaches to control the amount of gas withdrawn from a network at a given time to meet an uncertain power demand stream in an optimal way. To enhance supply reliability, we require demand satisfaction at a prescribed probability level, mathematically formulated in terms of a chance constraint. The stochastic optimal control framework has been set up in [1]. The gas flow trough the pipelines is modeled by the isentropic Euler equations and the Ornstein-Uhlenbeck process is used to model the uncertain demand. Acknowledgments The authors are grateful for the support of the German Research Foundation (DFG) within the project “Novel models and control for networked problems: from discrete event to continuous dynamics” (GO1920/4-1).

References

[1] S. Göttlich, R. Korn, and K. Lux, Optimal control of electricity input given an uncertain demand, Mathematical Methods of Operations Research, (2019).

We hope to see you there!