

Descriptions of available dissertation projects in MATH+

AA4-13: Equilibria for Distributed Multi-Modal Energy Systems under Uncertainty

Motivated by timely and important applications on the way to the transition to green energy, the project focuses on understanding and modeling multi-modal energy systems using the example of green hydrogen gas as a storage mechanism for electricity markets powered by variable renewable energy.

The work tasks include:

- Studying these systems in a game-theoretical context that couples the physical constraints on the network, written in the form of partial differential equations with uncertainties, with the strategic behavior of agents participating in the energy market subject to uncertainties.
- Analyzing distributed stochastic models where agents do not share all information but need to find equilibrium strategies.
- Developing and implementing novel distributed algorithms to find a market equilibrium computationally.

The position is hosted in Research Group “Nonsmooth Variational Problems and Operator Equations”. The project is a collaboration between Prof. Dr. M. Hintermüller, Dr. C. Geiersbach, Dr. P. Dvurechensky in Research Group “Stochastic Algorithms and Nonparametric Statistics”, and Dr. A. Kannan at Humboldt University of Berlin.

Please find the official call for applications for this position here: <https://wias-berlin.softgarden.io/job/23741406?l=de>

[BMS Research Training Area 7](#), Faculty: M. Hintermüller, P. Dvurechensky, C. Geiersbach, A. Kannan

AA3-16: Likelihood Geometry of Max-Linear Bayesian Networks

This research project is part of the Application Area "Networks" and focuses on the mathematical and statistical analysis of graphical models whose variables can produce large observed values that spread through a network (such as risk propagation in credit markets and flooding in river networks), powered by concepts and tools from tropical geometry. MATH+, the Berlin Mathematics Research Center, is a cross-institutional and interdisciplinary Cluster of Excellence. It sets out to explore and further develop new approaches in application-oriented mathematics.

- basic knowledge in the field of tropical geometry is required
- knowledge in the field of mathematical statistics is an advantage
- programming experience is an advantage

Please find the official call for applications for this position here:

<https://tub.stellenticket.de/de/offers/155540/>

[BMS Research Training Area 4](#), Faculty: C. E. Améndola Cerón