Universität Hamburg
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Fakultät für Mathematik, Informatik
und Naturwissenschaften
Fachbereich Mathematik

Donnerstag, den 12. November 2026, um 14:30 Uhr, im Hörsaal 2

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Observability and controllability of the heat equation with randomly displaced or defaulting sensor cells

Zusammenfassung/Abstract:

We consider the heat equation on bounded and unbounded rectangular domains in $\mathbb{R}^d$. We discuss null controllability and observability from a subset of the domain, called in the following the sensor set. If controllability holds, we also study estimates on the control cost depending on the underlying geometric parameters of the domain and the sensor set.

The novelty we consider is that the sensor set consists of a periodic array of sensor cells that may be randomly displaced or default stochastically. Correspondingly, the control cost, or equivalently the observability constant, is a random quantity. We analyze with what probability the null controllability property holds or does not, and, in the case that it holds, we derive estimates on the tail probability for high values of the control cost constant. A related model where the sensor cells are centered at points of a Poisson point process is considered as well.

This is joint work with Daniel Rosen from Dortmund.

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