

## Optimization and Equilibrium Seminar

**Speaker:** Caroline Geiersbach (University of Hamburg, Alemania)

**Title:** Numerical solution of optimal control problems under uncertainty.

**Abstract:** The topic of this talk is a class of optimal control problems subject to uncertainty. We highlight some of the difficulties in the infinite-dimensional setting, which is of interest in physics-based models where a control belonging to a Banach space acts on a system described by a partial differential equation (PDE) with random inputs or parameters. We compare numerical approaches based on sample average approximation (SAA) and stochastic approximation (SA). The latter approach can be shown to perform competitively for applications in PDE-constrained optimization and numerical discretization error can also be carefully balanced with stochastic error.

In the second part of the talk, we discuss applications where the state of the system, or the solution to the PDE, is further constrained. For the numerical solution, a Moreau-Yosida regularization of the state constraint is proposed. We highlight recent developments, which show that SAA approximations are consistent with the solution of the original problem as the sample size is taken to infinity. Moreover, we present interesting challenges in connection with an SA approach.

**Miércoles 12 de Marzo de 2025, a las 16:15 hrs.**

**Sala de Seminarios John Von Neumann del Centro de Modelamiento Matemático (Beauchef 851, Edificio Norte, Piso 7).**



