Seminar/Talk

PDE in Control — Applications in Finance and Learning

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Host: M. Beiglböck, N. Berestycki, L. Erdös, J. Maas, F. Toninelli, E. Schertzer

The theory of stochastic control offers a framework for understanding, analyzing, and designing random systems with the goal of achieving desired outcomes. It finds wide-ranging applications in finance, engineering, and data science. Stochastic control problems are known to be related to nonlinear parabolic partial differential equations (PDEs), which are powerful tools in problem solving. In this talk, we will review the viscosity theory of finite dimensional nonlinear parabolic PDEs and discuss their applications in adversarial prediction problems. Subsequently, we will introduce the mean field control problem, which models the decision-making in large populations of interacting agents. This corresponds to a class of nonlinear parabolic PDEs on Wasserstein space. As a main result, we will present a comparison principle for such equations and characterize the value function of a filtering problem as the unique viscosity solution. Based on the joint work with Erhan Bayraktar and Ibrahim Ekren.

Monday, April 22, 2024 03:45pm - 04:45pm
Mondi 2 (I01.01.008), Central Building

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