



Mathematics and CS Seminar

Massive Particle Systems, Wasserstein Brownian Motions, and the Dean--Kawasaki SPDE

Lorenzo Dello Schiavo

ISTA

Host: Jan Maas

Let W be a conservative, ergodic Markov diffusion on some arbitrary state space M , converging exponentially fast to equilibrium. We consider: (1) Systems of up to countably many massive particles in M , with finite total mass. Each particle is subject to an independent instance of the noise W , with volatility the inverse mass carried by the particle. We prove that the corresponding infinite system of SDEs has a unique solution, for every starting configuration and every distribution of the masses in the infinite simplex. (2) Solutions to the Dean--Kawasaki SPDE with singular drift, driven by the generator L of W . We prove that the equation may be given rigorous meaning on M , and that it has a unique distributional solution. This extends Konarovskiy--Lehmann--von Renesse's 'ill-posedness vs. triviality' to the case of infinitely many massive particles. (3) Diffusions with values in the space P of all probability measures on M , driven by the geometry induced by L . (4) In the case when M is a manifold, differential-geometric and metric-measure Brownian motions on P induced by the geometry of optimal transportation and reversible for a normalized completely random measure. We show that all these objects coincide.

Tuesday, May 28, 2024 04:30pm - 05:30pm

Office Bldg West / Ground floor / Heinzl Seminar Room (I21.EG.101)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.