Jump processes as generalized gradient systems

Riccarda Rossi (University of Brescia, Italy)

The approach à la Jordan-Kinderlehrer-Otto to a vast class of evolutionary problems, interpreted as gradient flows in Wasserstein spaces, was extended by Maas and Mielke to Markov chains via the introduction of Benamou-Brenier type distances. Nonetheless, the study of the microscopic origin of jump processes by means of large deviations theory suggests that such processes possess a generalized gradient system structure based on non-homogeneous dissipation potentials that do not give rise to any metric structure.

This talk revolves around the generalized gradient system structure that we have proposed for these processes in collaboration with Mark Peletier, Giuseppe Savaré and Oliver Tse. To build it, we have introduced a suitable 'dynamical-variational' transport cost that induces a notion of length. Based on it, we can set forth an extended version of the Minimizing Movement scheme. We show the convergence of the discrete solutions arising from the time-incremental minimization scheme, to a curve fulfilling a suitable 'non-metric' gradient flow formulation for the original jump process.