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Weak optimal transport with moment constraints: constraint qualification, dual attainment and entropic regularization

lundi 13 octobre 2025 16:10 (50 minutes)

Weak optimal transport is a nonlinear version of the classical mass transport of Monge and Kantorovich which has received a lot of attention since its introduction by Gozlan Roberto, Samson and Tetali, ten years ago. In this talk, I will address weak optimal problems (possibly entropically penalized) incorporating both soft and hard (including the case of the martingale condition) moment constraints. Even in the special case of the martingale optimal transport problem, existence of Lagrange multipliers corresponding to the martingale constraint is notoriously hard (and may fail unless some specific additional assumptions are made). We identify a condition of qualification of the hard moment constraints (which in the martingale case is implied by well-known conditions in the literature) under which general dual attainment results are established. We also analyze the convergence of entropically regularized schemes combined with penalization of the moment constraint and illustrate our theoretical findings by numerically solving in dimension one, the Brenier-Strassen problem of Gozlan and Juillet and a family of problems which interpolates between monotone transport and left-curtain martingale coupling of Beiglböck and Juillet. This talk is based on a recent joint work with Hugo Malamut and Maxime Sylvestre.

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