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Global vs Local for Optimization in the Space of Measure

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The difficulty of optimization in the space of measures on a continuous domain can be separated into two problems, each corresponding to a phase of optimization algorithms: (i) the global phase : how to approach the neighborhood of a global minimizer efficiently? and (ii) the local phase : how to obtain high-accuracy solutions from a warm start? For the global phase, we'll discuss approaches based on convex optimization — presenting in particular an accelerated mirror descent method that converges provably faster than FISTA or Frank-Wolfe —and approaches based on non-linear Langevin dynamics, with new convergence guarantees. For the local phase, we will argue, via quantitative convergence guaranties, that following the Wasserstein-Fisher-Rao geometry is the best way to « slide » the grid/particles with first order methods.

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