

Continuous Algorithms

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Abstract

While the design of algorithms is traditionally a discrete endeavour, in recent years many advances have come from continuous perspectives. Typically, a continuous process, deterministic or randomized, is designed and shown to have desirable properties, such as approaching an optimal solution or a target distribution, and an algorithm is derived from this by appropriate discretization. We will discuss examples of this for optimization (gradient descent, interior-point method) and sampling (Brownian motion, Hamiltonian Monte Carlo), with applications to learning. In some interesting and rather general settings, the current fastest methods have been obtained via this approach.

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