

A CONNECTION BETWEEN TEMPERING AND ENTROPIC MIRROR DESCENT

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This talk explores the connections between tempering (for Sequential Monte Carlo; SMC) and entropic mirror descent to sample from a target probability distribution whose unnormalized density is known. We establish that tempering SMC corresponds to entropic mirror descent applied to the reverse Kullback-Leibler (KL) divergence and obtain convergence rates for the tempering iterates. Our result motivates the tempering iterates from an optimization point of view, showing that tempering can be seen as a descent scheme of the KL divergence with respect to the Fisher-Rao geometry, in contrast to Langevin dynamics that perform descent of the KL with respect to the Wasserstein-2 geometry. We exploit the connection between tempering and mirror descent iterates to justify common practices in SMC and derive adaptive tempering rules that improve over other alternative benchmarks in the literature.