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I will discuss the convergence of a wide collection of algorithms for both optimization and sampling based on discretization of extended systems of ordinary and stochastic differential equations. These methods introduce control laws to guide convergence and build in a form of adaptivity through dynamics. They are particularly well adapted to “stiff systems” in which steep gradients in some components can dramatically slow or destabilize standard algorithms.

Joint work with Katerina Karoni (University of Edinburgh) and Gabriel Stoltz (Ecole des Ponts).