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Stochastic Variational Inference

Variational inference has become one of the most popular ways to find parametric approximations to distributions and sees widespread use in both Bayesian statistics and deep learning. While the classical approach is quite elegant, it was held back by necessary assumptions on both the model and its approximation, but with the advent of deep learning and the popularization of stochastic gradient methods variational inference could suddenly be applied with much greater generality and has allowed probabilistic models to be scaled to more complicated designs and larger datasets. In this short course we will introduce variational inference and contrast the classical and modern forms before highlighting some of the novel issues that arise in the general setting.