

MONTE CARLO MARATHON





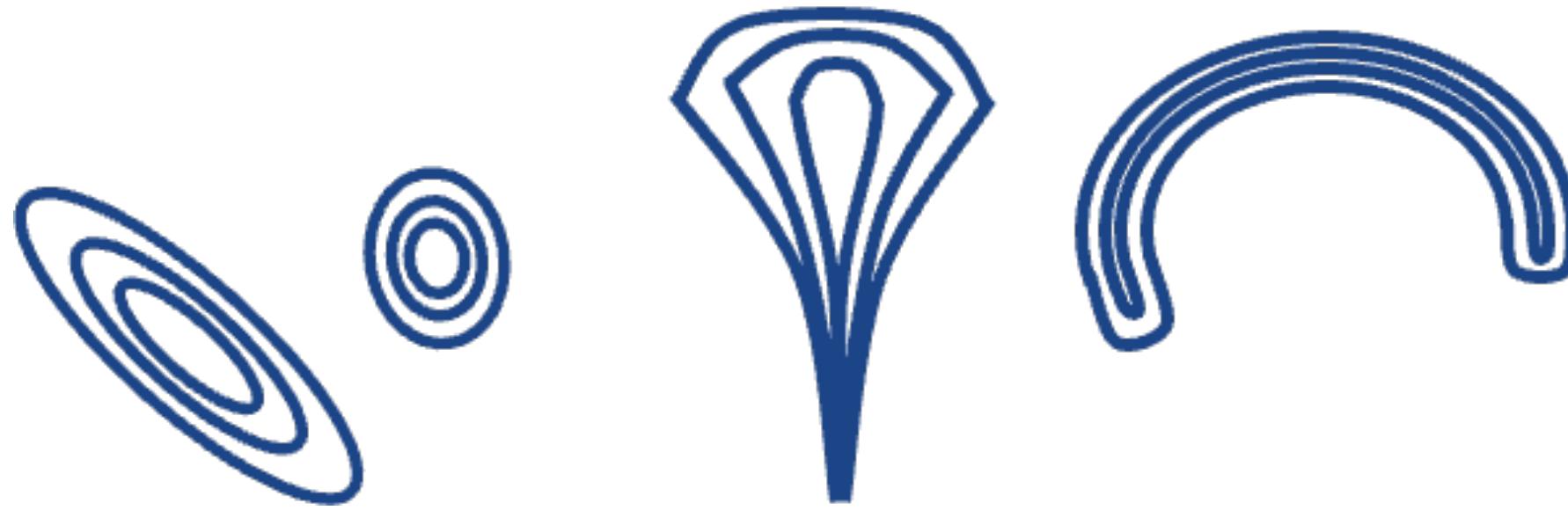
- ▶ By the law of large numbers, the average a.s. converges to $\pi[f]$ as $T \rightarrow \infty$

$$\pi[f] = \lim_{T \rightarrow \infty} \frac{1}{T} \sum_{t=1}^T f(X_t)$$



► A class of MC methods that construct a Markov chain X_t that is stationary with respect to target π

- ▶ **Problem:** Generating samples is hard...



MARKOV CHAIN MONTE CARLO

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- ▶ **Problem:** Generating samples is hard...
- ▶ **Solution:** Markov chain Monte Carlo (MCMC)
 - ▶ A class of MC methods that construct a Markov chain X_t that is stationary with respect to target π
 - ▶ E.g. metropolis-Hastings, MALA, HMC, slice sampler, etc
 - ▶ By the law of large numbers, the average a.s. converges to $\pi[f]$ as $T \rightarrow \infty$

$$\pi[f] = \lim_{T \rightarrow \infty} \frac{1}{T} \sum_{t=1}^T f(X_t)$$



PROBLEMS WITH MCMC

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- ▶ **Problem:** MCMC kinda sucks...

