MIXING-TIME

20

- For $\epsilon > 0$, we define the **mixing time** for a π-invariant kernel K equals

$$\tau_{\text{mix}}(\epsilon) = \inf \left\{ t : \sup_{\mu \in \mathscr{P}(\mathbb{X})} \mathrm{TV}(\mu K^t, \pi) < \epsilon \right\}$$

- The mixing time for a uniformly ergodic chain satisfies:

$$\tau_{\mathrm{mix}}(\epsilon) < \frac{\log \frac{\epsilon}{M}}{\log \rho}$$

- τ_{mix} measures how long it takes to achieve stationarity and forget μ

- A Markov chain is **geometrically ergodic** if there exists a $M(x) > 0$ and $\rho \in [0,1]$

$$\forall x \in \mathbb{X}, \quad \mathrm{TV}(K^t(x, \cdot\,), \pi) \leq M(x)\rho^t$$

- A Markov chain is **uniformly ergodic** if $M(x) \leq M$ for some $M < \infty$

MIXING-TIME

- For $\epsilon > 0$, we define the **mixing time** for a π-invariant kernel K equals

$$\tau_{\text{mix}}(\epsilon) = \inf\left\{ t : \sup_{\mu \in \mathscr{P}(\mathbb{X})} \text{TV}(\mu K^t, \pi) < \epsilon \right\}$$

  - τ_{mix} measures how long it takes to achieve stationarity and forget μ

- A Markov chain is **geometrically ergodic** if there exists a $M(x) > 0$ and $\rho \in [0,1]$

$$\forall x \in \mathbb{X}, \quad \text{TV}(K^t(x, \cdot\,), \pi) \leq M(x)\rho^t$$

  - A Markov chain is **uniformly ergodic** if $M(x) \leq M$ for some $M < \infty$

- The mixing time for a uniformly ergodic chain satisfies:

$$\tau_{\text{mix}}(\epsilon) < \frac{\log \frac{\epsilon}{M}}{\log \rho}$$

CENTRAL LIMIT THEOREM