Intuition about Bayes Risk

- All $\mathscr{P}_\theta$ are the same $\Longrightarrow$ Can't say anything about θ from x

- Need to capture how different $\mathscr{P}_\theta$ are

- One way to capture:

- If $\mathscr{P}_\theta$ are "close" to some Q on average, then $I(\mathscr{P}, w)$ is "small"

$$I(\mathscr{P}, w) = \inf_{Q} E_{\theta \sim w}[d_{\mathsf{KL}}(\mathscr{P}_\theta \parallel Q)]$$

Intuition about Bayes Risk

- All $\mathscr{P}_\theta$ are the same $\implies$ Can't say anything about θ from x
  - Need to capture how different $\mathscr{P}_\theta$ are
- One way to capture:

$$I(\mathscr{P}, w) = \inf_Q E_{\theta \sim w}[d_{\mathsf{KL}}(\mathscr{P}_\theta \,\|\, Q)]$$

- If $\mathscr{P}_\theta$ are “close” to some Q on average, then $I(\mathscr{P}, w)$ is “small”

Bayes Risk Lower Bounds