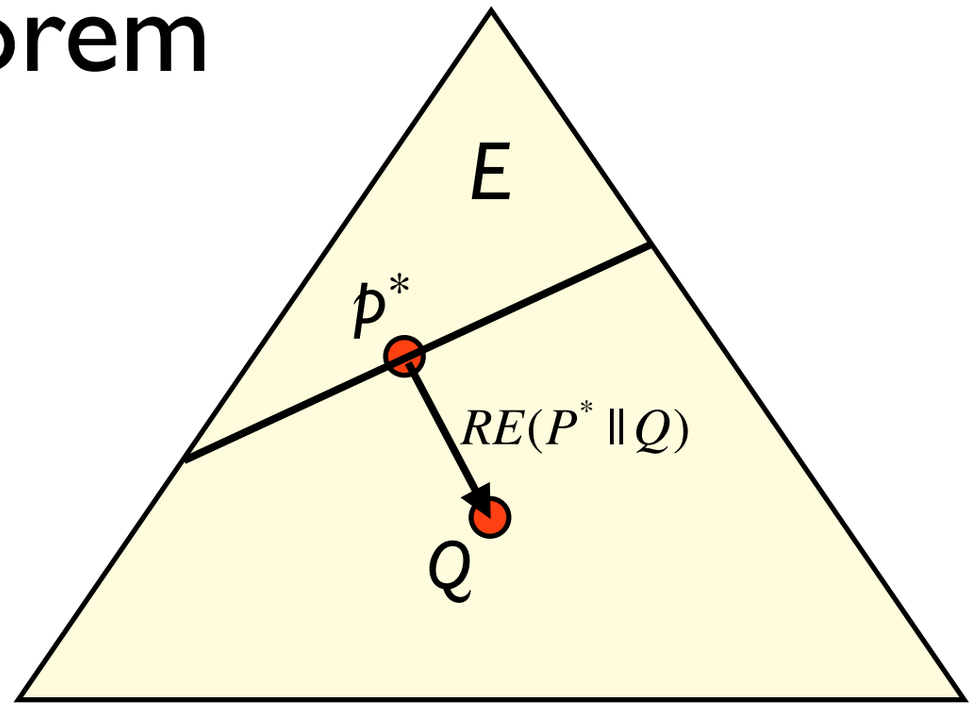
Sanov's Theorem



Let $X_1, X_2, \ldots, X_n$ be iid with empirical dist $Q(x)$

Let $E \subseteq \mathbf{P}$ be a set of probability Distributions over the finite alphabet H. Then

$$Q^n(E) = Q^n(E \cap \mathbf{P}_n) \leq (n+1)^{|H|} 2^{-nRE(P^* \| Q)}$$

Where $P^* = \min_{P \in E} RE(P \| Q)$