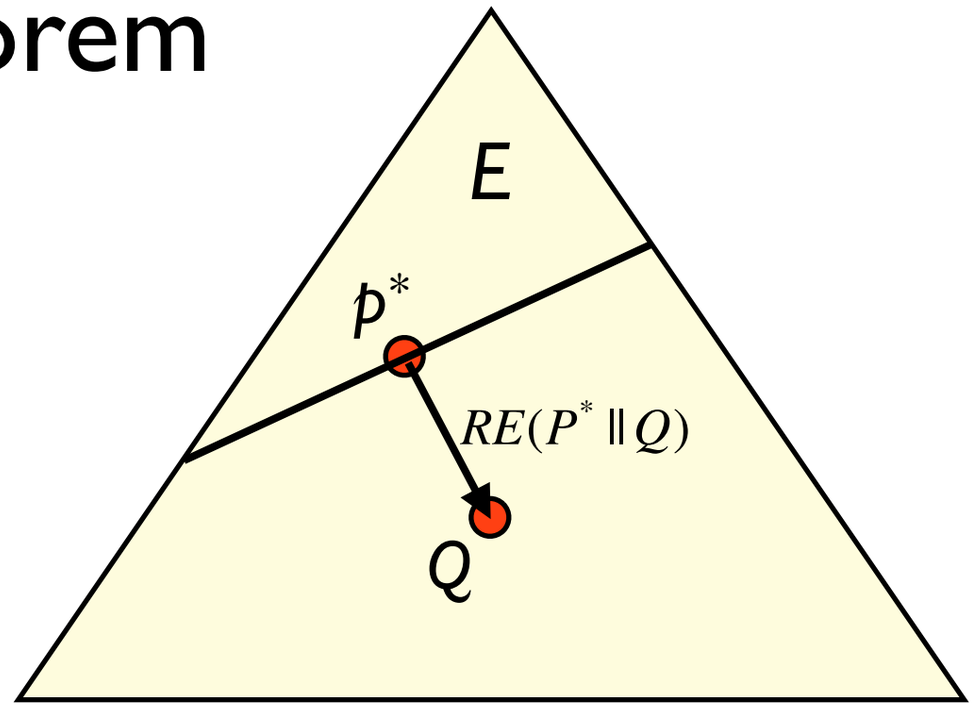
Sanov's Theorem



Let $X_1, X_2, \ldots, X_n$ be iid according to a distribution Q

Over a finite alphabet H.

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

Then the probability of generating a sample with

empirical distribution in E is:

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

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