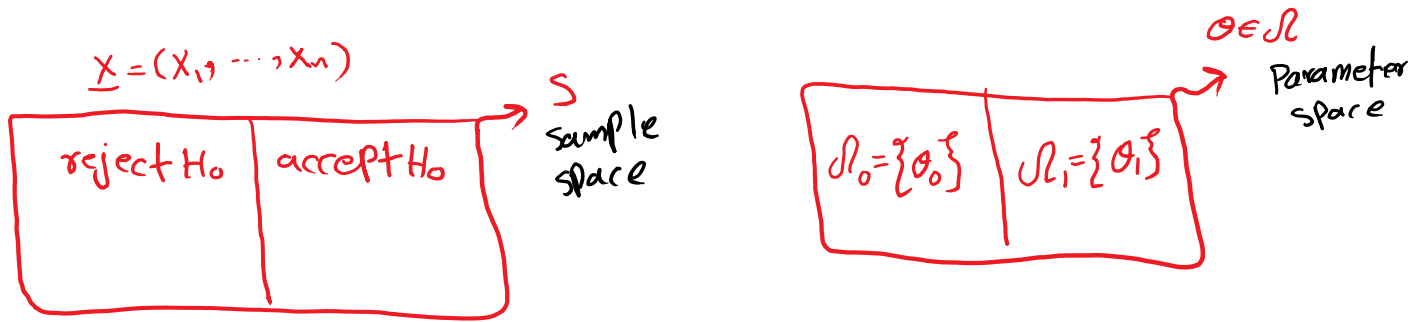
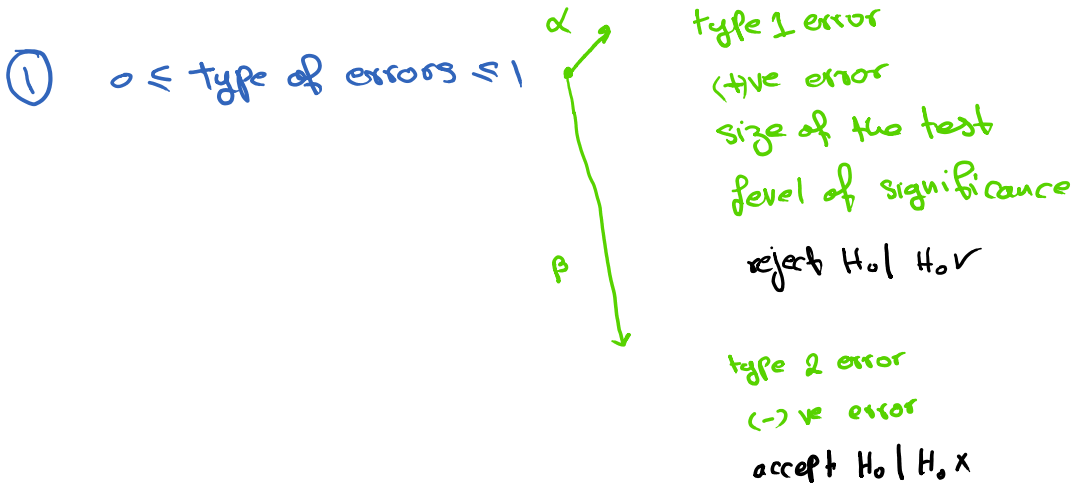


$$X_i \sim f(x_i; \theta), i=1, 2, \dots, n$$



$$\gamma = \begin{cases} H_0: \theta \in \mathcal{D}_0 \text{ or } \theta = \theta_0 \\ \text{vs} \\ H_1: \theta \in \mathcal{D}_1 \text{ or } \theta = \theta_1 \end{cases}$$

test



② $0 \leq \text{power function} \leq 1 \longrightarrow \pi_{\gamma} = \pi = 1 - \beta$

reject H_0 | H_0 ✗

③ most powerful test δ_{MP} with size α_{MP} if

\forall other γ with size α

and $\alpha \leq \alpha_{MP}$

$$\pi_{\delta_{MP}} \geq \pi_{\gamma} \Leftrightarrow \beta_{MP} \leq \beta$$

How to find δ_{MP} for given α_{MP} ?

by Neyman-Pearson Lemma

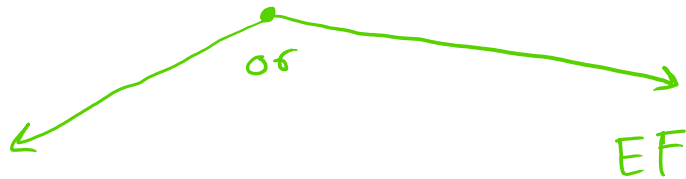
$$\lambda = \frac{L(\underline{x}; \theta_0)}{L(\underline{x}; \theta_1)} = \frac{\prod_{i=1}^n f(x_i; \theta_0)}{\prod_{i=1}^n f(x_i; \theta_1)}$$

Likelihood Ratio (LR)

② reject H_0 if $\lambda < k$, $k = ?$

③ find k for given α_{MP} . i.e.,

$$\alpha_{MP} = P(\underbrace{\lambda < k}_{\text{reject } H_0} \mid \underbrace{\theta_0}_{H_0 \text{ v}})$$



$$f(x_i; \theta) = e^{a(\theta) + b(x_i) + c(\theta)d(x_i)}$$

①

	$\theta_0 < \theta_1$	$\theta_0 > \theta_1$
$c(\theta) \uparrow$	$\sum_{i=1}^n d(x_i) > k$	$\sum_{i=1}^n d(x_i) < k$
$c(\theta) \downarrow$	$\sum_{i=1}^n d(x_i) < k$	$\sum_{i=1}^n d(x_i) > k$

reject H_0

② find k for given α_{MP} . i.e.,

$$\alpha_{MP} = P(\underbrace{\quad}_{\text{reject } H_0} \mid \underbrace{\theta_0}_{H_0 \text{ v}})$$