

Repetition week 45

Hypothesis testing.

$$H_0 : \theta \in \Omega_0 \quad H_1 : \theta \in \Omega_0^c$$

LRT

$$\lambda(\mathbf{x}) = \frac{\sup_{\theta \in \Omega_0} L(\theta|\mathbf{x})}{\sup_{\theta} L(\theta|\mathbf{x})} = \frac{\sup_{\theta \in \Omega_0} L(\theta|\mathbf{x})}{L(\hat{\theta}|\mathbf{x})} = \lambda^*(T(\mathbf{x}))$$

Reject if $\lambda(\mathbf{x}) \leq c$.

Power function

$$\beta(\theta) = P_{\theta}(X \in R)$$

UMP

$$\beta(\theta) \geq \beta'(\theta) \quad \forall \theta \in \Omega_0$$

Neyman-Pearson

$$H_0 : \theta = \theta_0 \quad H_1 : \theta = \theta_1$$

UMP level α test.

$$x \in R \text{ if } f(x|\theta_1) > kf(x|\theta_0)$$

$$x \in R^c \text{ if } f(x|\theta_1) < kf(x|\theta_0)$$

for some $k \geq 0$ and $\alpha = P_{\theta_0}(X \in R)$

Interval Estimator

$$[L(\mathbf{X}), U(\mathbf{X})]$$

Interval Estimate

$$[L(\mathbf{x}), U(\mathbf{x})]$$

Coverage Probability

$$P(\theta \in [L(\mathbf{X}), U(\mathbf{X})])$$

Confidence coefficient

$$\inf_{\theta} P(\theta \in [L(\mathbf{X}), U(\mathbf{X})])$$