Repetition week 45

Hypothesis testing.

$H_0 : \theta \in \Omega_0 \qquad H_1 : \theta \in \Omega_0^C$

LRT

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

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

Power function

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

UMP

$\beta(\theta) \geq \beta'(\theta) \ \forall \theta \in \Omega_0^C$

Neyman-Pearson

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

UMP level α test.

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

$x \in R^C$ if $f(x|\theta_1) < kf(x|\theta_0)$

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

Interval Estimator

$$\left[L(\boldsymbol{X}),U(\boldsymbol{X})\right]$$

Interval Estimate

$$\left[L(\boldsymbol{x}),U(\boldsymbol{x})\right]$$

Coverage Probability

$$P\left(\theta\in\left[L(\boldsymbol{X}),U(\boldsymbol{X})\right]\right)$$

Confidence coefficient

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