

Confidence intervals

Recap: confidence sets

Let $\theta \in \Theta$ be a parameter of interest, and X_1, \dots, X_n a sample. A set $C(X_1, \dots, X_n) \subseteq \Theta$ is a $1 - \alpha$ **confidence set** for θ if

$$\inf_{\theta \in \Theta} P_{\theta}(\theta \in C(X_1, \dots, X_n)) = 1 - \alpha$$

Inverting a test

Example: Uniform

Suppose $X_1, \dots, X_n \stackrel{iid}{\sim} \text{Uniform}[0, \theta]$. We want to test

$$H_0 : \theta = \theta_0 \quad H_A : \theta \neq \theta_0$$

Find the LRT statistic for this test.

Example: Inverting the t-test

Suppose that $X_1, \dots, X_n \stackrel{iid}{\sim} N(\mu, \sigma^2)$. We want to construct a $1 - \alpha$ confidence interval for μ .

Construct a $1 - \alpha$ confidence interval for μ by inverting the t -test.

Pivotal quantities

Example