# Confidence intervals

# Recap: confidence sets

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

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

# Using confidence sets to test hypotheses

# Example: Inverting the t-test

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

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

# Pivotal quantities

# Example