Lecture 10 notes

Tuesday, October 3, 2023 10:17 AM

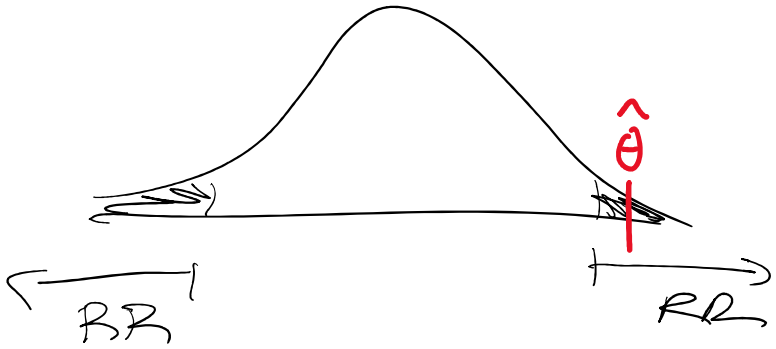
Hypothesis Test

(1) H_0: null / conventional wisdom, $H_0: \theta = \theta_0$

(2) H_A: alternative. $H_A: \theta \neq \theta_0$

(3) Test statistic from $\hat{\theta}$

(4) Rejection Region (RR)



Type I error: reject H_0 when H_0 is true

Type II error: accept H_0 when H_A is true

$Pr(\text{Type I}) = \alpha$

$Pr(\text{Type II}) = \beta$

$\text{Power} = 1 - \beta$

(1) $H_0 = p_1 - p_2 = 0$

(2) $H_A = p_1 - p_2 \neq 0$

(3) Z

(4) $\alpha = .05$; $[-.9, 7.1]$

$$(\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}} > 0$$

$$(\hat{p}_1 - \hat{p}_2) > z \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$$\frac{(\hat{p}_1 - \hat{p}_2)}{\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}} > z$$

$$\frac{\hat{\theta}}{\sigma_{\hat{\theta}}} > z$$

$$\frac{3.1}{\sqrt{\frac{55.6(44.4)}{n} + \frac{52.5(47.5)}{n}}} > 1.96$$

3.1

$$\sqrt{\frac{4962.4}{n}} > 1.96$$

$$\frac{3.1}{1.96} > \sqrt{\frac{4962.4}{n}}$$

$$\left(\frac{3.1}{1.96}\right)^2 > \frac{4962.4}{n}$$

$$n > 1983.7$$