6C PI

Contents

6C Prediction Interval

[ToC]

If $X_1, \ldots, X_n$ are R.S from $N(\mu, \sigma^2)$, then

- $100(1-\alpha)\%$ prediction interval for the next ovservation X_{n+1} is

$$X_{n+1} \text{ is within } \left(\overline{X} \pm Z_{\frac{\alpha}{2}}\sigma\sqrt{\frac{1}{n}+1}\right)$$

- If we need to replace σ with S, then replace $z_{\frac{\alpha}{2}}$ with $t_{\frac{\alpha}{2},n-1}$.

Prediction Interval

If $X_1, \ldots, X_n$ are R.S from $N(\mu, \sigma^2)$, then

- $100(1-\alpha)\%$ prediction interval for the next ovservation X_{n+1} is

$$\overline{X} \pm Z_{\frac{\alpha}{2}} \sigma \sqrt{\frac{1}{n} + 1}$$

- If we need to replace σ with S, then replace $z_{\frac{\alpha}{2}}$ with $t_{\frac{\alpha}{2}, n-1}$.

C.1 Ex: Bus Routs

A metropolitan transit authority wants to determine whether there is any need for changes in the frequency of service over certain bus routes. Wants to know if average miles traveled per person by all residents in the area is 5miles or less. n=120, sample mean=4.66, assume population SD = 1.5

C.2 Ex: Daily Sales

Average daily sales at small food store are known to be \$452.8. The manager recently implemented some changes in store interior, and want to know if the sales have improved. For last 12 days, the sales averaged \$501.9, and sample SD=\$65. Is the change significant?