Q9

$$\begin{aligned}\text{Predicted Occupancy} = \beta_0 &+ \beta_1 \cdot L(\text{occRate}, 1) + \beta_2 \cdot L(\text{occRate}, 4) \\ &+ \beta_3 \cdot L(\text{unRate}, 1) + \beta_4 \cdot L(\text{unRate}, 2) \\ &+ \beta_5 \cdot L(\text{pctChgGNP}, 1) + \beta_6 \cdot L(\text{pctChgGNP}, 2)\end{aligned}$$

Substituting the coefficients and lagged values:

$$\begin{aligned}\text{Predicted Occupancy} = 19.6414 &+ 0.44325 \cdot 79.6 + 0.33285 \cdot 80.5 + (-3.23461) \cdot 3.6 + 3.32051 \cdot 3.6 \\ &+ 66.26557 \cdot 0.00681 + (-7.05974) \cdot 0.01162\end{aligned}$$

Breaking down the terms:

$$\begin{aligned}0.44325 \cdot 79.6 &= 35.2676 \\ 0.33285 \cdot 80.5 &= 26.7878 \\ -3.23461 \cdot 3.6 &= -11.6446 \\ 3.32051 \cdot 3.6 &= 11.9538 \\ 66.26557 \cdot 0.00681 &= 0.4514 \\ -7.05974 \cdot 0.01162 &= -0.0821\end{aligned}$$

$$\text{Predicted Occupancy} = 19.6414 + 35.2676 + 26.7878 - 11.6446 + 11.9538 + 0.4514 - 0.0821$$

$$\text{Predicted Occupancy} = 82.3757$$

$$\text{Margin of Error} = t^* \cdot \frac{s}{\sqrt{n}}$$

Where:

$$t^* = 1.977, \quad s = 2.855, \quad n = 152$$

First, calculate the standard error

$$\frac{2.855}{\sqrt{152}} = 0.231$$

Now, calculate the margin of error:

$$\text{Margin of Error} = 1.977 \cdot 0.231 = 0.457$$

$$\text{Prediction Interval} = \text{Predicted Occupancy} \pm \text{Margin of Error}$$

$$\begin{aligned}\text{Lower Bound} &= 82.3757 - 0.457 = 81.9187 \\ \text{Upper Bound} &= 82.3757 + 0.457 = 82.8327\end{aligned}$$

$$\boxed{(81.92, 82.83)}$$