Prediction Equations

Mean Prediction Standard Error

$$s_{\bar{y}_p} = \sqrt{\underbrace{s^2}_{\text{Residual standard deviation}} \left[\overbrace{\frac{1}{n}}^{\text{Standard error of intercept}} + \overbrace{\frac{(x_p - \bar{X})^2}{SS_X}}^{\text{Standard error of slope}} \right]}$$

Individual Prediction Standard Error

$$s_{\hat{y}_p} = \sqrt{\underbrace{s^2}_{\text{Residual standard deviation}} \left[\overbrace{\frac{1}{n}}^{\text{Standard error of intercept}} + \overbrace{\frac{(x_p - \bar{X})^2}{SS_X}}^{\text{Standard error of slope}} + \underbrace{1}_{\text{Standard deviation around the regression line}} \right]}$$

Cook's distance

- s^2 – residual standard deviation
- p – number of predictors
- $\widehat{y_j}$ – predicted value for Observation j
- $\widehat{y_{j(i)}}$ – predicted value for Observation j when Observation i is left out.

$$D_i = \frac{\sum_{j \neq i} (\widehat{y_j} - \widehat{y_{j(i)}})^2}{p s^2}$$