Forward-stepwise selection based on AIC vs significance level.

Consider the first iteration: AIC of the model with x_j is

$$AIC_j = n\{\ln(SSR_j/n) + 2$$

Based on AIC: include the variable that leads to the greatest reduction in SSR.

Alternatively, we can use F test to evaluate the significance of each variable. For variable x_j,

Unrestricted model: $y = \beta_0 + \beta_1 x_j + u$, SSR_j

Restricted model: $y = \beta_0 + u$ SSR

F stat for $H_0: \beta_1 = 0$ is

$$\frac{(SSR - SSR_j)/1}{SSR_j/(n-2)} = (n-2)\left(\frac{SSR}{SSR_j} - 1\right)$$