Partial F test

(Section 3.3 in Montgomery *et al*)

The partial F test compares a full model with a reduced model which is obtained from the full model by setting r of the β_j's equal to 0.

- Full model:

  $y = \beta_0 + \beta_1 x_1 + \ldots + \beta_{k-r} x_{k-r} + \beta_{k-r+1} x_{k-r+1} + \ldots + \beta_k x_k + \epsilon$.

- Reduced model: $y = \beta_0 + \beta_1 x_1 + \ldots + \beta_{k-r} x_{k-r} + \epsilon$.

- Null hypothesis: $H_0 : \beta_{k-r+1} = \beta_{k-r+2} + \ldots + \beta_k = 0$. Sets r parameters equal to 0.

- n observations, $p = k + 1$ predictor variables.

- Calculate error sum of squares for full (SSE_{full}) and reduced (SSE_{red}) models.

- Test statistic:

$$F = \frac{(SSE_{red} - SSE_{full})/r}{MSE_{full}}$$

- p-value: $P(F_{r,n-p} > F_{obs})$.