

Using the partial F test to compare a full and reduced model

The following reads the cement data set, then fits a pair of models, and compares the fits with the partial F test.

- Full model: $y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \epsilon$
- Reduced model: $y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \epsilon$
- Null hypothesis: $H_0 : \beta_3 = \beta_4 = 0$

```
> data=read.csv("http://chase.mathstat.dal.ca/~bsmith/stat3340/Data/cement.csv")
> dim(data)
```

```
[1] 13  6
```

```
> head(data)
```

	i	y	x_1	x_2	x_3	x_4
1	1	78.5	7	26	6	60
2	2	74.3	1	29	15	52
3	3	104.3	11	56	8	20
4	4	87.6	11	31	8	47
5	5	95.9	7	52	6	33
6	6	109.2	11	55	9	22

```
> lm.out=lm(y~x_1+x_2+x_3+x_4,data=data)
> lm.out2=lm(y~x_1+x_2, data=data)
> anova(lm.out,lm.out2)
```

Analysis of Variance Table

Model 1: $y \sim x_1 + x_2 + x_3 + x_4$

Model 2: $y \sim x_1 + x_2$

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	8	47.864				
2	10	57.904	-2	-10.041	0.8391	0.4668