

```

/* SAS program for analysis of covariance, with one */
/* factor and one covariate. Data are from example */
/* 16.1, p. 947 in the text. Response Y is plant */
/* yield; treatment levels are control (C), slow */
/* release fertilizer (S), fast release fertilizer */
/* (F), covariate is initial plant height. */
options nocenter ls=72;
data;
  input y x trt $;
  cards;
12.2 45 c
12.4 52 c
11.9 42 c
11.3 35 c
11.8 40 c
12.1 48 c
13.1 60 c
12.7 61 c
12.4 50 c
11.4 33 c
16.6 63 s
15.8 50 s
16.5 63 s
15.0 33 s
15.4 38 s
15.6 45 s
15.8 50 s
15.8 48 s
16.0 50 s
15.8 49 s
  9.5 52 f
  9.5 54 f
  9.6 58 f
  8.8 45 f
  9.5 57 f
  9.8 62 f
  9.1 52 f
10.3 67 f
  9.5 55 f
  8.5 40 f
  ;

```

```

proc glm;
  class trt;
  model y=trt;
proc glm;
  class trt;
  model y=x trt;
proc glm;
  class trt;
  model y=x trt x*trt;
run;

```

The GLM Procedure

Class Level Information

Class	Levels	Values
trt	3	c f s

Number of observations 30

Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value
Model	2	207.6826667	103.8413333	394.28
Error	27	7.1110000	0.2633704	
Corrected Total	29	214.7936667		

Source	Pr > F
Model	<.0001

Error

Corrected Total

R-Square	Coeff Var	Root MSE	y Mean
0.966894	4.119852	0.513196	12.45667

Source	DF	Type I SS	Mean Square	F Value
trt	2	207.6826667	103.8413333	394.28

Source	Pr > F
trt	<.0001

Source	DF	Type III SS	Mean Square	F Value
trt	2	207.6826667	103.8413333	394.28

Source	Pr > F
trt	<.0001

The GLM Procedure

Class Level Information

Class	Levels	Values
trt	3	c f s

Number of observations 30

Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value
Model	3	214.3759539	71.4586513	4447.85
Error	26	0.4177128	0.0160659	
Corrected Total	29	214.7936667		

Source	Pr > F
Model	<.0001

Error

Corrected Total

R-Square	Coeff Var	Root MSE	y Mean
0.998055	1.017537	0.126751	12.45667

Source	DF	Type I SS	Mean Square	F Value
x	1	0.4721494	0.4721494	29.39
trt	2	213.9038045	106.9519022	6657.08

Source	Pr > F
x	<.0001
trt	<.0001

Source	DF	Type III SS	Mean Square	F Value
x	1	6.6932872	6.6932872	416.62
trt	2	213.9038045	106.9519022	6657.08

Source	Pr > F
x	<.0001
trt	<.0001

Class Level Information

Class	Levels	Values
trt	3	c f s

Number of observations 30

Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value
Model	5	214.4372247	42.8874449	2887.70
Error	24	0.3564420	0.0148517	
Corrected Total	29	214.7936667		

Source	Pr > F
Model	<.0001

Error

Corrected Total

R-Square	Coeff Var	Root MSE	y Mean
0.998341	0.978334	0.121868	12.45667

Source	DF	Type I SS	Mean Square	F Value
x	1	0.4721494	0.4721494	31.79
trt	2	213.9038045	106.9519022	7201.30
x*trt	2	0.0612708	0.0306354	2.06

Source	Pr > F
x	<.0001
trt	<.0001
x*trt	0.1491

Source	DF	Type III SS	Mean Square	F Value
x	1	6.65321124	6.65321124	447.97
trt	2	6.69631934	3.34815967	225.44
x*trt	2	0.06127080	0.03063540	2.06

Source	Pr > F
x	<.0001
trt	<.0001
x*trt	0.1491