

```
(ch5-table5-4_H01.out)
FILENAME file1 URL "http://www.uvm.edu/~rsingle/stat231/data/other/kuehl-table5-4.dat";
DATA a1;
  INFILE file1 FIRSTOBS=2 EXPANDTABS;
  INPUT method $ batch sample residue;
  RUN;
```

*NOTE: 'Varname' in quotes is the name used in the text ;

*Version 3: Nested Terms (EXPLICIT nesting via MODEL terms);

```
Title1 "VER.3: SS(error)=SS('Sampling'), SS(batch(method))=SS('Error')" ;
Title2 "VER.3: E(MS) Type I or Type III give same result";
PROC GLM DATA=a1;
  CLASS method batch sample;
  MODEL residue = method batch(method) / E1;
  RANDOM batch(method) / TEST;
  TEST H=method E=batch(method) ;
  RUN;
```

VER.3: SS(error)=SS('Sampling'), SS(batch(method))=SS('Error')
 VER.3: E(MS) Type I or Type III give same result

Dependent Variable: residue

(1a) Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	8310.416667	1662.083333	30.17	0.0004
Error	6	330.500000	55.083333		
Corrected Total	11	8640.916667			

(2a) Source	DF	Type I SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	137.07	<.0001 **INCORRE
batch(method)	4	760.333333	190.083333	3.45	0.0860

(3a) Source	DF	Type III SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	137.07	<.0001 **INCORRE
batch(method)	4	760.333333	190.083333	3.45	0.0860

[RANDOM / TEST]

(4a) Source	Type I Expected Mean Square
method	Var(Error) + 2 Var(batch(method)) + Q(method)
batch(method)	Var(Error) + 2 Var(batch(method))

Tests of Hypotheses for Mixed Model Analysis of Variance

Source	DF	Type I SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	39.72	0.0032
Error	4	760.333333	190.083333		

Error: MS(batch(method))

Source	DF	Type I SS	Mean Square	F Value	Pr > F
batch(method)	4	760.333333	190.083333	3.45	0.0860
Error: MS(Error)	6	330.500000	55.083333		

[TEST]

Tests of Hypotheses Using the Type I MS for batch(method) as an Error Term

(6a) Source	DF	Type I SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	39.72	0.0032

*Version 1 (IMPLICIT nesting via data coding & MODEL order -- DANGEROUS);

```
Title1 "VER.1: SS(error)=SS('Sampling'), SS(batch)=SS('Error')" ;
Title2 "VER.1: E(MS) Type I only";
PROC GLM DATA=a1;
  CLASS method batch sample;
  MODEL residue = method batch / E1 E3;
  RANDOM batch / TEST;
  TEST H=method E=batch / HTYPE=1 ETYPE=1;
  TEST H=method E=batch / HTYPE=3 ETYPE=3;
RUN;
```

VER.1: SS(error)=SS('Sampling'), SS(batch)=SS('Error')

VER.1: E(MS) Type I only

Dependent Variable: residue

(1b) Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	8310.416667	1662.083333	30.17	0.0004
Error	6	330.500000	55.083333		
Corrected Total	11	8640.916667			

(2b) Source	DF	Type I SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	137.07	<.0001 **INCORRE
batch	4	760.333333	190.083333	3.45	0.0860

(3b) Source	DF	Type III SS	Mean Square	F Value	Pr > F
method	0	0.0000000	.	.	.
batch	4	760.333333	190.083333	3.45	0.0860

[RANDOM / TEST]

(4b) Source	Type I Expected Mean Square
method	Var(Error) + 2 Var(batch) + Q(method)
batch	Var(Error) + 2 Var(batch)

Tests of Hypotheses for Mixed Model Analysis of Variance

Source	DF	Type I SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	39.72	0.0032
Error: MS(batch)	4	760.333333	190.083333		

Source	DF	Type I SS	Mean Square	F Value	Pr > F
batch	4	760.333333	190.083333	3.45	0.0860
Error: MS(Error)	6	330.500000	55.083333		

(5b) Source	Type III Expected Mean Square
method	0
batch	Var(Error) + 2 Var(batch)

NO TESTS FROM RANDOM STATEMENT DUE TO TYPE III E(MS)=0

[TEST]

Tests of Hypotheses Using the Type I MS for batch as an Error Term

(6b) Source	DF	Type I SS	Mean Square	F Value	Pr > F
method	1	7550.083333	7550.083333	39.72	0.0032

Tests of Hypotheses Using the Type III MS for batch as an Error Term

(7b) Source	DF	Type III SS	Mean Square	F Value	Pr > F
method	0	0	.	.	.