

The CONTRAST subcommand indicates the contrast coefficients for factor CEFFECT. The PARTITION subcommand divides the CEFFECT factor into 2 groups for the contrasts. The first group has one degree of freedom with the contrast (3, -1, -1, -1). The second group (CEFFECT(2)) corresponds to the second and third contrasts lumped together and has two degrees of freedom.

The complete MANOVA command file is given in Figure 1.28a.

Figure 1.28a

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RUN NAME      ANALYSIS OF VARIANCE WITH CARRY-OVER EFFECTS.
COMMENT      DATA IS TAKEN FROM COCHRAN AND COX(1957) PAGE 135.
             CEFFECT REPRESENTS THE CARRY-OVER EFFECTS.
             CEFFECT=1 IF NO RESIDUAL EFFECTS.
             2 IF RESIDUAL EFFECT A.
             3 IF RESIDUAL EFFECT B.
             4 IF RESIDUAL EFFECT C.
VARIABLE LIST PERIOD,COW,SQUARE,TREATMNT,CEFFECT,DEP
INPUT MEDIUM CARD
INPUT FORMAT  FIXED(2X,5F1.0,F10.0)
N OF CASES   18
MANOVA       DEP BY PERIOD(1,3),COW(1,6),SQUARE(1,2),
             TREATMNT(1,3), CEFFECT(1,4)/

             CONTRAST(CEFFECT) = SPECIAL(1 1 1 1, 3 -1 -1 -1,
             0 2 -1 -1, 0 0 1 -1 )/

             PARTITION(CEFFECT) = (1,2)/

             DESIGN = COW, PERIOD WITHIN SQUARE,
             CEFFECT(2), TREATMNT/
             DESIGN = COW, PERIOD WITHIN SQUARE,
             TREATMNT, CEFFECT(2)/

READ INPUT DATA
11111 38.
12121 109.
13131 124.
14211 86.
15221 75.
16231 101.
21122 25.
22133 86.
23114 72.
24232 76.
25213 35.
26224 63.
31133 15.
32114 39.
33122 27.
34224 46.
35232 34.
36213 1.
FINISH

```

In the first DESIGN specification, treatment effects are adjusted for the residual effects, and the converse holds in the second DESIGN specification. The ANOVA summary tables for both models are given in Figure 1.28b.

Figure 1.28b

TESTS OF SIGNIFICANCE FOR DEP USING SEQUENTIAL SUMS OF SQUARES

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG. OF F
RESIDUAL	199.25000	4	49.81250		
CONSTANT	61483.55556	1	61483.55556	1234.29974	0.0
COW	5781.11111	5	1156.22222	23.21149	.005
PERIOD WITHIN SQUARE	11489.11111	4	2872.27778	57.66179	.001
CEFFECT(2)	38.42222	2	19.21111	.38567	.703
TREATMNT	2854.55000	2	1427.27500	28.65295	.004

TESTS OF SIGNIFICANCE FOR DEP USING SEQUENTIAL SUMS OF SQUARES

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG. OF F
RESIDUAL	199.25000	4	49.81250		
CONSTANT	61483.55556	1	61483.55556	1234.29974	0.0
COW	5781.11111	5	1156.22222	23.21149	.005
PERIOD WITHIN SQUARE	11489.11111	4	2872.27778	57.66179	.001
TREATMNT	2276.77778	2	1138.38889	22.85348	.006
CEFFECT(2)	616.19444	2	308.09722	6.18514	.060

Note that in this example, the number of observations receiving r_a , r_b , and r_c are equal (4). If the design is not balanced with respect to residual effects, contrast coefficients for unequal numbers of replicates must be used to create the desired residual effects.