```
VARIANCE EXPLAINED BY CANONICAL VARIABLES OF DEPENDENT VARIABLES

CAN. VAR.      PCT VAR DEP     CUM PCT DEP     PCT VAR COV     CUM PCT COV

      1         79.14597        79.14597        39.48249        39.48249

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CORRELATIONS BETWEEN COVARIATES AND CANONICAL VARIABLES

         CAN. VAR.

COVARIATE               1

INTEL                .94646
CONOBV               .30260
CONRMT               .56188
JOB                  .57787
CI1                  .62672
CI2                  .69288
CI3                  .79114

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VARIANCE EXPLAINED BY CANONICAL VARIABLES OF THE COVARIATES

CAN. VAR.      PCT VAR DEP     CUM PCT DEP     PCT VAR COV     CUM PCT COV

      1         22.34706        22.34706        44.79657        44.79657
```

Note that although the number of canonical variates is equal to s = min(p,q), MANOVA prints only those variates that have a significant canonical correlation. The default significance level is 0.15 and can be changed by using the ALPHA specification, as described in Section 1.35.

1.42 Residuals

MANOVA will calculate and print predicted values and residuals for each response variable if

```
PRINT=POBS/
```

is specified in a MANOVA run (POBS stands for predicted observation). The output also includes the case numbers, observed values, and standardized residuals (obtained by dividing the residuals by the error standard deviation).

If multiple error terms are specified in an analysis of covariance model and the residuals for each case are needed, the ERROR subphrase should be used to designate which error term's regression coefficients are to be used in calculating the predicted values. Any error term defined in the design can be used. Consider, for example, a 3 × 2 factorial design with repeated measures on factor B, a SUBJECT factor nested within factor A, and a covariate X. (See Section 1.44 for a discussion of the repeated measures design.) The following MANOVA cards may be used to obtain residuals and significance tests for the model.

```
MANOVA          Y BY A(1,3) SUBJECT(1,3) B(1,2) WITH X/
                PRINT=POBS(ERROR(2))/
                DESIGN=A VS 1, B VS 2, A BY B VS 2,
                    SUBJECT W A = 1, B BY SUBJECT W A = 2/
```

ERROR(2) within the POBS phrase indicates that the regression coefficients associated with error term 2 are to be used to calculate the predicted values for the model (error term 2 is defined in the DESIGN specification as the interaction between B and SUBJECT (within A)).

Various residual plots (observed versus predicted values, observed values versus standardized residuals, predicted values versus standardized residuals, and case number versus standardized residuals) are also available. For a discussion of the graphic features of MANOVA see Section 1.51.

1.43 SPECIAL TOPICS

1.44 Repeated Measures Designs

1.45 Introduction

Designs in which multiple observations are made on a single experimental unit are called repeated measures designs. For example, if a patient's blood pressure is recorded daily for five days after administration of antihypertensive are medication, five repeated observations are obtained for the same case. If only one variable is being measured, say systolic blood pressure, the design is termed singly multivariate. If several variables, such as standing and recumbent systolic and diastolic blood pressures are recorded, the design is doubly multivariate. Since multiple observations are made on the same experimental unit, they are not independent. Special procedures must therefore be used for analysis of repeated measures data.