CHAPTER 7

COMPUTER PROGRAMS

The methods described in previous chapters were programmed using PROC MATRIX of SAS (Barr, Anthony J., Goodnight, James H., Sall, John P., and Helwig, Jane T., 1976). This also allowed us to use other capabilities in SAS, such as PROC GLM for the overall univariate/multivariate analysis. Examples were given to illustrate the method and computations using SAS. The program listing is given in Appendix 1. In Appendix 1, the following macros were given.

(i) MANTM: Stepwise MANOVA in Time
(ii) MANPOL: Stepwise MANOVA in Polynomial
(iii) MANCPOL: Stepwise MANCOVA in Polynomial
(iv) STORP: Standardized orthogonal Polynomials
(v) LDE: Stepwise MANOVA in Polynomial with trend in dose
(vi) MAN2CP: Stepwise MANCOVA in Polynomial with 2x2 design
It is noted that the macro (iv) STORP can be generated by using the built-in function in SAS

\[ Q = \text{ORPOL}(x, p) \]

where \( x \) = Vector of time points from which the orthogonal polynomials to be generated.

\( p \) = desired degree of a polynomial

\( Q \) = standardized orthogonal polynomials.

These macros can be used individually with the data set as specified (fixed order).

(a) \( \text{DATA D1;} \)
\( \text{INPUT } T1 - T5 \ TR; \)
\( \text{CARDS; \hspace{1cm}} \)
\( \hspace{1cm} \)
\( \hspace{1cm} \)
\( ; \text{MANTH} \)

(b) \( \text{DATA D1;} \)
\( \text{INPUT } T1 - T5 \ TR; \)
\( \text{CARDS; \hspace{1cm}} \)
\( \hspace{1cm} \)
\( \hspace{1cm} \)
\( ; \text{MANPOL} \)
Also input in X-Vector: Actual Time Points to generate specified degree orthogonal polynomials.

(c) DATA D1;
INPUT T1 - T5 TR;
CARDS;
.
.
; MANCPOL

Also input in X-Vector: Actual Time Points to generate specified degree orthogonal polynomials.

(d) Also these three Macros can be run together with the same data as specified

DATA D1;
INPUT T1 - T5 TR;
CARDS;
.
.
; MANTH
; MANCPOL (Using T1 = covariate)
; MANPOL

This will give results illustrated in Section 3.8.
(e) DATA D1;
  INPUT T1 - T14 DOSE;
  CARDS;
  .
  .
  ; LDE
This will give results illustrated in Section 4.5.

(f) DATA D1;
  INPUT A B COV WK1 - WK4;
  CARDS;
  .
  .
  ; MAN2CP
This will give results illustrated in Section 5.5.