ABSTRACT

Multivariate ranking and selection (MVRS) is now becoming an active area of research. It is an attractive technique especially in repeated measurements data analyses. Under this model various 'preference functions' and 'selection procedures' have been recently developed to analyse such data. In early analyses these types of data were handled using multivariate significance test procedures such as multivariate analysis of variance (MANOVA) and multivariate multiple comparisons (MMC). These procedures, having arisen in an ad-hoc manner, have certain model deficiencies and hence are less efficient than the MVRS procedures. However, one criticism of the MVRS approach is that the preference functions suggested in the literature to date are not very practical. Thus far most of these preference functions rely on reducing the problem to the univariate case in order that the required computations can be made. This reduction whereas desirable from the computational aspect does not allow the experimenter to express a realistic preference function.

In this thesis a new preference function without the above restrictions is developed. The indifference zone approach of the MVRS model is used to analyse the repeated measurements data of a specific multivariate (normal) problem frequently encountered in biological and medical experimentation. A numerical example is given to illustrate the new preference function. A discussion of the advantages and disadvantages of the MVRS model compared to the MANOVA and MMC is also presented.