

SUMMARY

This report describes an attempt that is made in solving a problem on sugar cane breeding in Barbados. The main objective is to arrive at a decision, as to which of two varieties to recommend for planting. The form of the data suggests the fitting of a linear structural model, with a particular error structure and with non-homogenous error variances. Recommendations depend on the intercept, slope and cross over point (i.e. the point of intersection between the fitted line and the line with slope equal to unity).

Some of the parameters in the model i.e. slope, intercept and error variances, are estimated using a maximum likelihood method. The estimators are not in closed form, and are evaluated by an iterative procedure. The variances of the intercept and slope are obtained via the information matrix. The cross over point is estimated analytically, and its variance is obtained using the delta technique.

A likelihood ratio test is performed on the model for lack of fit, and a t-test is used to test the hypothesis that the slope is equal to unity.

Real data are used to see how well the model fits. Results indicated that this model does not seem to fit this particular set of data well but with simulated data the method appears to be well-behaved. Both sets of results (i.e. with real and simulated data) are summarized and discussed.

A general discussion on the method of analysis is given. Some comments are made on alternative methods which might be relevant to this and other similar problems.