Dissertation Abstract

DE GUZMAN, ADOLFO (1989). Dimension, dimension reduction and loss of Information. Ph. D. Dissertation, University of the Philippines.

Abstract

Dimension reduction in Multivariate Data Analysis is defined via dimension-reducing transformations in the context of Dimension Theory and the dimension reduction problem is formulated as optimizing a functional on a loss function over a class of dimension-reducing transformations for a given class of p-variate random vectors. A theory for loss of information due to dimension reduction using Shannon's information function is presented. Estimates of entropy and loss of information as well as their large sampling distributions are provided. Tests of certain hypothesis are also given. Open problems are briefly described for further investigation.

KAMAL RAHIM (1988). A study on statistical analysis of data from intercropping experiments. Doctoral Dissertation, University of the Philippines.

Abstract

Experimental data from 21 intercropping trials involving two crops were used to (i) evaluate the possibility and usefulness of applying a bivariate analysis of variance to analyze yield data of both crops as intercrop; and (ii) examine the validity of the assumptions underlying the analysis of variance for Land Equivalent Ratio (LER).

For intercrop yields, the assumption of additivity was violated in 11 out of 21 trials examined (or 52%). The assumption of homogeneity of variance was not violated in 5 out o 21 trials (or 24%), two of which has the assumption of additivity violated. The two assumptions, normality and the homogeneity of correlation coefficients, on the other hand, were not violated in any of the 21 trials examined.

Since there is no evidence of heterogeneity of correlation coefficients in intercrop yield data, the use of bivariate analysis of variance seems possible.

PENA, SOPHIE PIEZAS (1987). Asymptotic normality of statistics in clustering, contagion and diversity. Ph. D. in Statistics, University of the Philippines.

Abstract

It is shown that a unified approach to establishing conditions for the asymptotic normality of statistics in connection with clustering, contagion and diversity may be given by two central limit theorems for random variables with arbitrary index sets. New results as well as results of other authors using different methods are obtained by direct application of the two theorems. By applying the theorems in conjunction with other techniques, conditions for the asymptotic normality of statistics whose distributions were previously unknown are established.

TABUNDA, ANA MARIA L. (1989). Prediction-based Asymptotic Specification tests in nonlinear simultaneous models. Ph. D. in Statistics, University of the Philippines.

Abstract

Asymptotic tests designed to detect model misspecification that adversely affects prediction in nonlinear simultaneous models are derived. The tests are constructed with the use of auxiliary regressions of the estimated prediction errors on chosen functions of explanatory variables. Significant results in the test for zero parameters in the linear regression model indicate misspecification due to incorrect functional form for or exclusion of relevant exogenous variables from the nonlinear model.

Two approaches to the construction of the tests are presented. The first approach, which utilizes Taylor series expansions of the estimated prediction errors, has been used by other authors. Here it is used in conjunction with the bootstrap predictor, a stochastic predictor that uses random draws from the empirical distribution function of the calculated sampled residuals as proxies in the simulation of the model. A second approach utilizing mixing assumptions on the auxiliary regression disturbances is developed.

FORMACION, SONIA PRUDENTE (1983). A dynamic stochastic model of a fish population. Ph. D. in Statistics, University of the Philippines.

Abstract

By considering a milkfish population growing in a well-managed pond where no births occur and where in-migration and out-migration of fish are not allowed, a dynamic stochastic mortality model of a biological population is developed which may also apply to biological populations other than a fish population. The process occurring in the pond is described in two equivalent ways:

i) In terms of the basic differential equations

$$q(t) = A(t)\ q(t)$$

where $q(t)$ is a vector of probabilities associated with the size of the population, $q(t)$ is a vector of first derivatives with respect to time of these probabilities, and $A(t)$ is a matrix involving the parameters used to described the process.

ii) In terms of the Kolmogorov forward differential equations

$$P(\pi, t) = P(\pi, t)\, A'(t)$$

where $A(t)$ is the same matrix as in i) and $P(\pi, t)$ is a matrix of transition probabilities.

When the parameters defining the process are taken at a fixed time, a recursive solution to the system of differential equations is derived and certain properties of the process are obtained. Explicit solutions to the system of differential equations are obtained under more simplifying assumptions on the parameters. Maximum likelihood estimators of the parameters are also derived under certain assumption regarding the time of entrance of the diseased states and the healthy states.