

Dimension, Dimension Reduction and
Loss of Information

by

Adolfo M. de Guzman, 1941 -

Dissertation, Submitted to the
Statistical Center, University of the Philippines
in Partial Fulfillment of the Requirements
for the Degree of
Ph.D. in Statistics

January 1989

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.