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THE PHILIPPINE STATISTICIAN 2006, Volume 55, Nos. 1-2

Robust L-Discriminant Analysis: Asymptotics, Simulation and Monte Carlo

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Abstract

This paper considers the small-to-moderate sample size behavior of a robust L discriminant function in terms of its total probability of misclassification (TPM) in comparison with the classical Fisher's linear discriminant rule. Three sample sizes, $n=30$, 60 and $n=100$, were used in simulating the behavior of the L discriminant rule in the context of a Tukey's contaminated normal model with contaminants fixed at $\epsilon=5\%$, 10% and 20% levels. Results indicate that at the ideal case ($\epsilon=0$), the L discriminant rule is about 104% as efficient as the classical rule while for contaminated data ($\epsilon=5\%$ to 20%), it is 1.30% more efficient than the classical rule. The study, therefore, recommends the use of an L-discriminant rule in almost all cases requiring the use of discriminant analysis.

Keywords: *L estimator, discriminant analysis, trimmed means, asymptotic variance, Monte Carlo, simulation*