

NEW ESTIMATORS OF DISCRIMINANT COEFFICIENTS AS THE GRADIENT OF LOG-ODDS

YO SHEENA* AND ARJUN K. GUPTA

*Department of Mathematics and Statistics, Bowling Green State University,
Bowling Green, OH 43403, U.S.A.*

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Abstract. We consider the problem of estimating the discriminant coefficients, $\boldsymbol{\eta} = \boldsymbol{\Sigma}^{-1}(\boldsymbol{\theta}^{(1)} - \boldsymbol{\theta}^{(2)})$ based on two independent normal samples from $N_p(\boldsymbol{\theta}^{(1)}, \boldsymbol{\Sigma})$ and $N_p(\boldsymbol{\theta}^{(2)}, \boldsymbol{\Sigma})$. We are concerned with the estimation of $\boldsymbol{\eta}$ as the gradient of log-odds between two extreme situations. A decision theoretic approach is taken with the quadratic loss function. We derive the unbiased estimator of the essential part of the risk which is applicable for general estimators. We propose two types of new estimators and prove their dominance over the traditional estimator using this unbiased estimator.

Key words and phrases: Unbiased estimator of risk, linear discriminant function, posterior log-odds.

*On leave from Shinshu University, Japan. Present corresponding address: Department of Economics, Shinshu University, 3-1-1 Asahi, Matsumoto, Nagano 390-8621, Japan, e-mail: sheena@econ.shinshu-u.ac.jp