Improved Variance Estimators From Bivariate Normal Population Based on Paired Observations

by

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Abstract-Typed full paper under preparation: Given a pair of observations \( \{x_i, y_i; i = 1, 2, \ldots, n\} \) on two variables \( X \) and \( Y \), for a random sample \( s \), the population parameters, namely, \( \mu_x, \mu_y, \sigma_x^2, \sigma_y^2 \) and \( \rho \) are usually estimated through the corresponding sampling statistics, such as sample means, variances and sample correlation coefficient. This paper considers an improvement of the customary estimator of population variance, A mixture (i.e. a weighted combination) of the customary estimator of the variance and a suitably chosen statistic \( t \) is proposed. It is also indicated that under some conditions for a broad range of values of the mixing constants, the improvement (w.r.t. mean square error) over the traditional estimator is possible. The problem of improving customary estimators for means of a finite population was considered by Tripathi and Caubey (1992), using paired observations and the study was extended further by Anirban et al (2000) and Tripathi et al (2001).