# Improved estimation of the population parameters when some additional information is available

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## Abstract

Estimation of population parameters is considered by several statisticians when additional information such as coefficient of variation, kurtosis or skewness is known. Recently Wencheko and Wijekoon (Stat Papers 46:101-115, 2005) have derived minimum mean square error estimators for the population mean in one parameter exponential families when coefficient of variation is known. In this paper the results presented by Gleser and Healy (J Am Stat Assoc 71:977-981, 1976) and Arnholt and Hebert (http://interstat.statjournals.net/YEAR/2001/articles/0103002.pdf, 2001) were generalized by considering T (X) as a minimal sufficient estimator of the parametric function $g(\theta)$ when the ratio $\tau^2 = [g(\theta)]^{-2} Var[T(X)]$ is independent of $\theta$. Using these results the minimum mean square error estimator in a certain class for both population mean and variance can be obtained. When T (X) is complete and minimal sufficient, the ratio $\tau^2$ is called "WIJLA" ratio, and a uniformly minimum mean square error estimator can be derived for the population mean and variance. Finally by applying these results, the improved estimators for the population mean and variance of some distributions are obtained.

## Author keywords

Coefficient of variation; Completeness; Minimal sufficient statistic; Optimal shrunken estimator