

An Improved Mathematical Model Applying Practicable Algorithms

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Abstract

In this article, we have considered the problem of estimation of population variance on two occasion successive sampling. A class of estimators of population variance has been proposed and its asymptotic properties have been discussed. The proposed class of estimators is compared with the sample variance estimator when there is no matching from the previous occasion. Numerical illustrations are also given in support of the present study.

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1. Introduction

Jessen introduced the idea of using information achieved on the first occasion in improving the estimates of the current occasion [1]. Later, Yates extended Jessen's schemes to the situations where the population mean of a variable is estimated on each one of the h (≥ 2) occasions for a rotation sample design [2]. These results were generalized by Patterson [3], Tikkiwal [4], Eckler [5], and Rao and Graham [6]. Generally, in successive sampling, our aim is to estimate the current average; the theory developed so far on successive sampling aims at providing the optimum estimate by combining.

- (a) a double sampling regression estimate from the matched portion, where the "large" sample is the first sample and the auxiliary variable x is the value of y (study variable) on the first occasion and
- (b) a sample mean based on a random sample from the unmatched portion. It is to be mentioned that a large number of estimators for estimating the current average have been studied by various authors.

A large number of estimators that estimate the population mean on the current occasion have been proposed by various authors, however, only limited efforts have been made to estimate the population variance on the current occasion in two occasions successive (rotation) sampling.

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