Theorems on Minimum Variance Estimation
Ed Stanek

Introduction

We discuss theorems on minimum variance estimation, particularly with reference to Rao (Sankhya, 1952) (ES2619) and Lehmann and Scheffé (Sankhya (1950)) (ES2615). We discuss in particular Rao’s paper with reference to a two stage sampling problem with unequal size sampling of clusters. In such a problem, we would like to simplify representation of a prediction problem to one where the basic set of random variables considered is a vector of sample and remaining totals for all PSUs. Rao and Bellhouse (1978) (ES2602) have stated a theorem (Theorem 1) that we have used to justify reducing expanded random variables to collapsed random variables in the context of a simple random permutation model. The question that we examine is whether or not this theorem applies in the context of predicting a PSU mean when two stage unequal size sampling is used in a two stage cluster sample.