On Approximatly Optimum Strata Boundaries using Two Auxiliary Variables

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Abstract—In the present investigation, a methodology has been developed for obtaining Approximately Optimum Strata Boundaries (AOSB), appropriate for surveys involving single study variable (Y), on the basis of two auxiliary variables (X and Z) closely related to the study variable. For theoretical development, regression model has been considered as $Y = C(X, Z) + e$, where $C(X, Z)$ is a function of X & Z and 'e' is error term. Minimal equations have been obtained, under certain assumptions, by minimizing the variance of the estimation variable. Due to implicit nature of these equations, a Cum $\sqrt[3]{D_1(x,z)}$ rule has been proposed for finding out AOSB. Comparisons have been made empirically, using certain density functions, with cube root method due to Singh and Sukhatme (1969) for single auxiliary variable. It showed remarkable gain in efficiency in case two auxiliary variables are used as the basis of stratification.

Keywords: Optimum stratification, Minimal equations, Strata boundaries.