On optimum stratification using mathematical programming approach

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ABSTRACT : Optimum stratification is a technique which results in minimum possible variance of the estimator for the population characteristic under study. The main objective of stratification is to give a better cross-section of the population so as to gain a higher degree of relative precision. The problem of determining optimum strata boundaries (OSB) was pioneered by Dalenius (1950). The problem of obtaining OSB was recently studied by Khan *et al.* (2009) who formulated the problem as a mathematical programming problem (MPP) by minimizing variance of the estimated population parameter subject to the condition that the sum of the widths of all the strata would be equal to the range of the given distribution under given allocation procedure. In the present investigation the problem of finding OSB has been taken into consideration as the problem of optimum strata width (OSW), using MPP by dynamic programming technique, when the study variable is uniformly distributed. Empirical study has also been taken where it is revealed that with the increase in the number of strata to a fixed number the precision of the method goes on increasing. Also the proposed method proves better than other stratification method (Singh,1967).

KEY WORDS : Mathematical programming problem, Optimum stratification, Optimum strata boundaries, Optimum strata width