

## **The first phase order sampling for the second phase stratification**

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The order sampling design is a fixed size sampling design without replacement where the elements in a finite population are selected with probabilities proportional to their size. In order to realize such a sampling design, the probability distribution, called an ordering distribution, is associated with each element in the population. Random variables with ordering distributions are realized and a predetermined number of population elements, corresponding to the smallest values of the random variables, is selected. The choice of ordering distributions offers various designs. Examples of such designs are sequential Poisson, Pareto, and successive sampling. The class of order sampling designs has been introduced by Swedish statistician Bengt Rosén beforehand. The author proposes here the second phase stratification for the first phase order sampling design, quasi-Horvitz-Thompson estimator of the total for a study variable, defined in the finite population, its approximate variance and the estimator for this variance. A similar strategy in the case of other first phase sampling designs and the Horvitz-Thompson estimator of the total have been studied by Imbi Traat and Maiki Ilves beforehand. The sampling strategy proposed here is important because the successive sampling design, which is a case of order sampling, arises naturally in selecting households through individuals when the list of households is not available. The household size plays a role of the household size measure. The second phase stratification by the size variable and a properly chosen second phase sample size allows us to equalize approximate inclusion probabilities of households and may be significant estimating the total of the variable which depends (or not) on the household size. Results of the simulation study with the real data will be shown in the presentation.

**Key Words:** Successive sampling, selection of households through individuals, estimator of total, estimator of variance.