Other Approaches to Bivariate Ranked Set Sampling

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ABSTRACT

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Bivariate ranked set sampling (BVRSS), as introduced by Al-Saleh and Zheng (2002), is not easy to implement in practice, because it requires the judgment ranking of each of the $m^2$ combination of the order statistics of the two characteristics. In this thesis, we investigate two modifications that make the method easier to use. The first modification is based on ranking one variable and noting the rank of the other variable for one cycle, and do the reverse for another cycle. The second approach is based on ranking of one variable and giving the second variable the same rank (Concomitant Order Statistic) for one cycle and do the reverse for the other cycle. The two procedures are investigated for estimation of the means of some well-known distributions; Bivariate Normal Distribution and Downton's Bivariate Exponential Distribution. It turned out that the suggested approaches are useful, can be used in practice and can be more efficient than using SRS. A real data set is used for illustration the second suggested BVRSS procedure.

Key Words: Ranked Set Sampling, Simple Random Sampling, Bivariate Ranked Set Sampling, Bivariate Normal Distribution, Downton's Bivariate Exponential Distribution, Concomitant Variable.