RANKING ERRORS IN RANKED SET SAMPLING

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ABSTRACT. It is established in the literature that ranked set sampling design provides high efficiency when ranking information is complete and low efficiency when ranking information is incomplete or in error. In the latter case, the statistical inference may not even provide a valid test and confidence interval. The solution to this problem depends on how the ranking mechanism is modeled. In this talk, I will provide a detailed development on possible ranking models and their use in statistical inference. One of the ranking model used in ranked set sampling is introduced by Bohn and Wolfe (1994, J. Amer .Stat. Assoc.) and later extended into larger class by Frey (2007, JSPI).

In this talk, I will develop statistical inference in the presence of judgment ranking errors in a ranked set sample by using Bohn-Wolfe model. I will provide a detailed development for the inference. The judgment ranking information is modeled through Bohn-Wolfe (Bohn and Wolfe, 1994) and Frey (Frey, 2007) models. The parameters of these models are estimated by minimizing a distance function that measures the distance between the data and ranking models. These estimated models are then used to calibrate the tests and confidence intervals. Simulation studies illustrate that the proposed procedure produces valid inference for ranked set samples even in the presence of ranking error. The use of the new estimator is illustrated in the construction of distribution-free confidence interval of the median spray deposits on the leaves of apple trees.

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