PARAMETRIC RANKED SET SAMPLING

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Abstract. Ranked set sampling was introduced by McIntyre (1952, *Australian Journal of Agricultural Research*, **3**, 385–390) as a cost-effective method of selecting data if observations are much more cheaply ranked than measured. He proposed its use for estimating the population mean when the distribution of the data was unknown. In this paper, we examine the advantage, if any, that this method of sampling has if the distribution is known, for a specific family of distributions. Specifically, we consider estimation of μ and σ for the family of random variables with cdf's of the form $F(\frac{x-\mu}{\sigma})$. We find that the ranked set sample does provide more information about both μ and σ than a random sample of the same number of observations. We examine both maximum likelihood and best linear unbiased estimation of μ and σ, as well as methods for modifying the ranked set sampling procedure to provide even better estimation.

Key words and phrases: Order statistic, ranked set sample, maximum likelihood estimator, best linear unbiased estimator.