

Ranked Set Sampling with Unequal Set Sizes

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Abstract: Ranked set sampling (RSS) is a data collection technique that makes use of expert knowledge or concomitant information to rank sample units before selecting which ones to actually measure. Previously developed RSS methodology has emphasized balanced or unbalanced RSS with common set size. There will, however, be situations where the data collection opportunities present themselves naturally in the form of varying set sizes, which leads to a number of interesting questions.

1. What does it mean to have a balanced RSS in this setting and how would we go about it?
2. How might we optimize the collection of unbalanced RSS observations in such settings?
3. Even if we agree on the answers to 1 and 2, what is the optimal way to combine RSS observations collected from differing set sizes?

Even more challenging is the thought of optimizing over all three options when the data collection opportunities present themselves in a random, sequential order with differing set sizes. In this work we present the results of some preliminary work on these problems.

This is joint work with Nader Gemayel and Elizabeth Stasny.