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A METHOD FOR THE CONSTRUCTION OF SEQUENTIAL SELECTION PROCEDURES[1]

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1. Introduction. Paulson [13] has given a sequential procedure for selecting the normal population with the largest mean when the k available populations have a common known variance. His formulation employed the indifference zone approach, which, briefly described, is the situation where the probability of making a correct decision is required to be at least a given amount whenever the greatest mean exceeds all the others by a certain specified amount. This approach has been studied extensively by Bechhofer, Kiefer and Sobel [2] in the context of ranking and identification problems.

Paulson's procedure combines two properties which other indifference zone procedures do not typically possess, namely: the procedure is truncated and fully sequential. Truncation is self-explanatory, but by fully sequential we mean that the procedure is able to discontinue taking observations from a particular population before the procedure terminates sampling altogether. A fully sequential procedure will often make a substantial savings in the total number of observations taken by quickly eliminating "bad" populations if they are present among the populations under consideration. However, in studying the performance of ranking procedures the parameters are usually assumed to be in the "least favorable configuration" (all populations the same except one, which is at the minimum required distance for which detection is expected) or in the "equal parameter configuration" (all populations the same). In both instances "bad" populations are not present. Therefore, this should be kept in mind when comparing a fully sequential procedure with one which is not fully sequential.

Paulson's procedure for normal means has been extended [10] to the Koopman–Darmois family with the same measure of distance as that considered by Bechhofer, Kiefer and Sobel [2]. The procedures of this extension are not truncated. However, it has been shown by Bechhofer, Kiefer and Sobel [2] that for many members of the Koopman–Darmois family and for this particular distance measure, no truncated procedure exists.

We present in this paper a technique for the construction of Paulson-type procedures which are both truncated and fully sequential. Briefly, these procedures are formed by choosing a statistic of the observations from any two of the populations and performing a modified sequential probability ratio test (SPRT) based on this statistic. This is done simultaneously for all pairs of populations, and if a

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