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# Empirical process approach to some two-sample problems based on ranked set samples

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**Abstract** We study the asymptotic properties of both the horizontal and vertical shift functions based on independent ranked set samples drawn from continuous distributions. Several tests derived from these shift processes are developed. We show that by using balanced ranked set samples with bigger set sizes, one can decrease the width of the confidence band and hence increase the power of these tests. These theoretical findings are validated through small-scale simulation studies. An application of the proposed techniques to a cancer mortality data set is also provided.

**Keywords** Shift function · Q–Q plot · P–P plot · Bootstrap · ROC curve · Wilcoxon–Mann–Whitney test