Low intensity resampling methods with applications to two sample unbalanced problems.

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Resampling methods are frequently used in practice to adjust critical values of nonparametric tests. A resampling method can usually be described in terms of an exchangeable scheme, $(W_n(1), \ldots, W_n(k_n))$, satisfiyng

$$\max_{1\le i\le k_n} |W_n(i) - \bar{W}_n| \underset{\text{Pr.}}{\to} 0 \quad \text{and} \quad \sum_{i=1}^{k_n} (W_n(i) - \bar{W}_n)^2 \underset{\text{Pr.}}{\to} 1,$$

with $\bar{W}_n = \frac{1}{k_n} \sum_{i=1}^{k_n} W_n(i)$. Recently, in [1, 2], complete asymptotic results have been given for linear resampling statistics

$$T_n^* = \sqrt{k_n} \sum_{i=1}^{k_n} W_n(i)(X_{n,i} - \bar{X}_n),$$

under the (mild) assumption that

$$\sqrt{k_n}(W_n(1) - \bar{W}_n) \underset{w}{\to} Z$$

for some nondegenerate limit random variable Z. This covers the study of two-sample linear permutation statistics for balanced samples, that is, for samples of sizes n_1, n_2, such that $n_1/(n_1+n_2) \to c \in (0, \infty)$. In a low intensity resampling scheme we have

$$\sqrt{k_n}(W_n(1) - \bar{W}_n) \underset{\text{Pr.}}{\to} 0.$$

This corresponds to the unbalanced case in which $n_1/(n_1+n_2) \to 0$, a case of parctical significance. In this talk we will provide asymptotics for linear resampling statistics in the low intensity setup.

References

[1] Janssen, A. (2004). Resampling Student t-type statistics*Preprint*.

[2] Janssen, A. and Pauls, T. (2003). How do bootstrap and permutation tests work? *Ann. Statist.*, **31**, 768-806.

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