Nonparametric Procedures for Factorial Designs: Treatment Effects and Testing Hypotheses

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Abstract:

Most existing tests for nonparametric factorial designs are based on ranks and hypotheses are formulated in terms of distribution functions. However, especially in heterogeneous settings, null hypotheses formulated in terms of parameters or effect measures and corresponding confidence intervals would be of more interest.
In this talk we explain that the effect measures, underlying existing rank-based procedures, may either lead to possibly paradox results or/and depend on sample sizes (except in the case of completely balanced designs). But this does not seem to be a reasonable property of an effect measure and may particularly cause problems in interpretations.
Thus, we propagate to work with unweighted nonparametric effect measures that can be motivated from so-called pseudo-ranks. We then introduce novel test procedures that are suitable for testing hypotheses formulated in these effects in general nonparametric factorial designs and analyze their large and small sample properties theoretically and in simulations. We note that the R-package *rankFD* performing the computations in general factorial designs can be downloaded from CRAN.