

A clustering-based test for non-additivity in an unreplicated two-way layout

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When there are several replicates available at each level combination of two factors, testing non-additivity can be done by the usual two-way ANOVA method. However, the ANOVA method cannot be used when the experiment is unreplicated (one observation per cell of the two-way classification). Several tests have been developed to address non-additivity in unreplicated experiments starting with Tukey's (1949) one-degree-of-freedom test for non-additivity. Most of them assume that the interaction term has a multiplicative form. But such tests have low power if the assumed functional form is inappropriate. This leads to tests which do not assume a specific form for the interaction term. This paper proposes a new method for testing interaction which does not assume a specific form of interaction. The proposed test has the advantage over the earlier tests that it can also be used for incomplete two-way tables. A simulation study is performed to evaluate the power of the proposed test and compare it with other well-known tests.

Keywords: Non-additivity tests; Unreplicated; Two-way table; ANOVA.