THE LEVEL PROBABILITIES FOR A SIMPLE LOOP ORDERING

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Abstract. Bartholomew's statistics for testing homogeneity of normal means with ordered alternatives have null distributions which are mixtures of chi-squared or beta distributions depending on whether the variances are known or not. The mixing coefficients depend on the sample sizes and the order restriction. If a researcher knows which mean is smallest and which is largest, but does not know how the other means are ordered, then a loop ordering is appropriate. Exact expressions for the mixing coefficients for a loop ordering and arbitrary sample sizes are given for five or fewer populations and approximations are developed for more than five populations. Also, the mixing coefficients for a loop ordering with equal sample sizes are computed. These mixing coefficients also arise in testing the ordering as the null hypothesis, in testing order restrictions in exponential families and in testing order restrictions nonparametrically.

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