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Huann-Sheng Chen. *A more powerful test procedure for multiple hypothesis testing.*

We propose a new multiple test called the minPOP test and three of its modified versions (the left truncated, the right truncated, and the double truncated minPOP tests) for testing multiple hypotheses simultaneously. Under the independence assumption, these tests have exact control of the global type I error rate. We further propose four multiple testing procedures based on these minPOP tests. We show that these multiple testing procedures have strong control of the family-wise error rate. A method for finding the p-values of the proposed multiple testing procedures after adjusting for multiplicity is also developed. Simulation results show that the minPOP tests in general have higher global power than the existing well known multiple tests, especially when the number of hypotheses being compared is relatively large. Among the multiple testing procedures we developed, we find that the ones based on the left truncated and double truncated minPOP tests tend to have higher number of rejections than the existing multiple testing procedures and the other multiple testing procedures based on the minPOP tests. (Received February 02, 2012)