

## **New Multiple Testing Methods in the Dependent Case**

### **Abstract**

Multiple testing procedures are usually single-step or step-wise. Typically, they are designed to control the family-wise error rate (FWER), false discovery rate (FDR) or are evaluated by some function of the expected numbers of type I and type II errors. Many popular procedures are based on P-Values from marginal distributions when the test statistics are independent and when test statistics are dependent. In the dependent case, there are some procedures that take the dependency into account only in determining critical values. Many of the more popular step-wise procedures have some shortcomings. The shortcomings include (i) not utilizing correlations among variables when they are dependent (ii) not having convex acceptance sections for tests of individual hypotheses (iii) taking unintuitive actions for some sample points. We offer a new methodology for the case of dependent statistics. The new method is free of most of the above-mentioned shortcomings. Furthermore, in many instances, under appropriate conditions, it compares favorably in terms of expected numbers of type I and type II errors.