Mathematical Statistics
Stockholm University
Research Report **2017:09**,
http://www.math.su.se

Estimating the Proportion of True Null Hypotheses under Copula Dependency

June 2017

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It is a well known result in multiple hypothesis testing that the proportion π_0 of true null hypotheses is not identified under general dependencies. However, it is possible to estimate π_0 if structural information about the dependency structure among the test statistics or p-values, respectively, is available. We demonstrate these points, and propose a marginal parametric bootstrap method. A pseudo-sample of bootstrap p-values is generated, which still carry information about π_0, but behave like realizations of stochastically independent random variables. Theoretical properties of resulting estimation procedures for π_0 are analyzed and their usage is illustrated on synthetic and real data.

MSC 2010 classification numbers: Primary 62J15; secondary 62F03.
Key words: Bootstrap, copula, family-wise error rate, p-values, Schweder-Spjøtvoll estimator.

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