He Jiang

UC San Diego Dept Mathematics

Research focus:
Resampling methods and hypothesis testing

Importance of simulations:
(1) To derive patterns that are extremely difficult to find mathematically
(2) To confirm and visually illustrate results proved mathematically

A Comparison of Permutation and Bootstrap Tests
(1) Does not need to know the underlying distribution of the sample

(2) Testing for equality of *means* (mainly in small sample sizes)

(3) Compare *Type I Error Rates* and *Power* in order to find out which test works best under different circumstances

(4) Each situation needs *5,000* samples(of *X* and *Y*), then each resampling method is carried out *B=10,000* times

(5) Four situations for Normal and Exponential cases respectively in finding *Type I Error Rate*, and four more situations for Normal and Exponential cases in finding *Power*

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Problem: The simulation takes too long on a personal computer, and cannot be accomplished in a timely manner
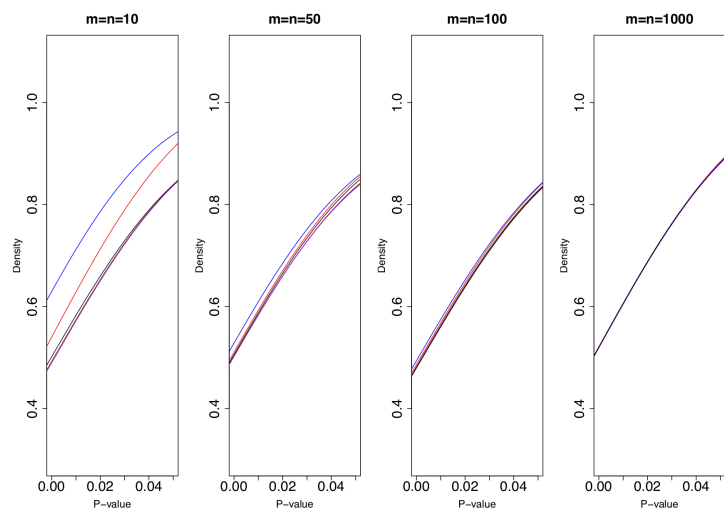
For example, this "simple" graph on the left illustrating *Type I Error Rates*, takes four sets of *12* hours to draw, which is around *48* hours total

Note that this is only around *1/4* of the total simulations in the entire project

Goal: Speeding up simulation process would greatly benefit further statistical researches in their computational part