

Assignment 1: Simulation in R (Summer 15)

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Analysis of variance (ANOVA) is the statistics testing whether population group means are equal. ANOVA can control familywise error rate such that the probability of detecting a group difference when null hypothesis is true is equal to the specified alpha level (e.g., .05). If independent t -test is implemented for different pairs of groups (e.g., 6 pairs from 4 groups), the probability of getting one significant difference among multiple pairs is higher than the specified alpha level.

Please conduct a simulation to show that conducting independent t -tests for multiple pairs really inflates familywise Type I error rate. The design conditions should vary both total sample size (group sizes are equal) and the number of groups. Note that the population means and variances are equal across groups.

Hint:

The functions that may be useful for this study are `any`, `t.test`, and `combn`.