

**18.443. Pset 5. Due Wednesday, Oct. 11.**

1.(50 points) Consider the third column - heart rate - in the normal body temperature dataset `normtemp.mat`. Let  $X_1, \dots, X_{65}$  be a sample of heart rate of men corresponding to rows 1 through 65. Let  $Y_1, \dots, Y_{50}$  be a random subset of size 50 of heart rate of women from rows 66 through 130. The reason you take a random subset is because the values are arranged in an increasing order in the dataset. In other words, you can randomly permute the values for women and then take the first fifty. For both samples, find a normal fit and test it using chi-squared test. Then, perform statistical analyses of both samples assuming that their distributions are normal. Find confidence intervals for the mean and variance of the distributions of both samples. Test if the means are equal using paired t-test, and t-tests for two samples with and without the assumption that the variances are equal. Test the hypothesis that the variances are equal using F-test. Write each step of your work, all formulas, threshold constants,  $p$ -values, etc. Use textbook tables to find the thresholds and  $p$ -values in each test.