

STAT 445 Lab 5  
ASSIGNMENT # 5  
Due: Lab 6 (at the end)

**Question 1. (Show R codes and the plot)**

Write an R function with argument ‘ $m$ ’ that will

- (i) Generate 25 values from  $N(5, 1)$ , and 25 values from  $N(5 + m, 1)$ .
- (ii) Do a 2-sample t test for the equality of means (assume equal variances) at 5% level of significance.
- (iii) Repeat (i) and (ii) 100 times, and count the number of ‘rejections’ by the t test.

Use this function to draw a power curve for the t test. Write a similar function to draw a power curve for Wilcoxon rank-sum test on the same graph with different line types. Use ‘legend’ to show which line corresponds to which test.

**Question 2. (Show R codes and the results)**

An experiment was conducted to compare the effectiveness of vitamin C in orange juice (‘orange’) and in synthetic ascorbic acid (‘acid’). 20 guinea pigs were randomized to these 2 treatments, with 10 guinea pigs allocated to each treatment. After 6 weeks the lengths of the odontoblasts were measured. The datafile ‘assign5.dat’ is on the course website. The hypothesis of no difference between the median lengths of the two groups is to be tested against the alternative that the two methods differ.

- (a) Use two-sample t test.
- (b) Use Wilcoxon rank-sum test.
- (c) Which of the two tests do you prefer in this particular case? Why?