

STA 635 homework 4

1. From the book by P. Allison, page 38-39. Please verify that the logrank test and Wilcoxon test he defines are in fact equivalent to what we defined in class: (by taking the weight function to be  $(R_1 R_2)/(R_1 + R_2)$  and  $R_1 R_2$ ) in a general class of tests:

$$\int W(s) \left( \frac{dN_1}{R_1} - \frac{dN_2}{R_2} \right)$$

2 Case 1: Two independent subjects: the first one has  $exp(\lambda_1)$  distribution, been observed from time zero until it got censored at time  $T_1$ . The second subject has  $exp(\lambda_2)$  distribution, enter the study at time  $T_1$  and observed to die at  $T_2$ .

Case 2: One subject following a two-piece exponential distribution with a change of hazard rate at  $T_1$ , this subject enter the study at time zero and is observed to die at  $T_2$ .

Show that the likelihood function for the two cases are identical.

3 Continuation of problem 6 in last homework (#3), Formally Test the difference between 3 groups in the colon data set. Use logrank and Wilcoxon tests. Report p-value.

4 Generate two samples of size 60 each. Each with the same positive distribution of your choice.

Randomly censored the samples so that there are about 20% censored observations. Finally use logrank/wilcoxon test to perform the test based on the censored data. Report the p-values.

Repeat the above 100 times and report 200 p-values.