

Problem 1

Suppose we have the following data:

Group 1: 4, 12+, 15, 21+, 23

Group 2: 2, 6+, 8+, 10, 19

Test $H_0 : h_1(t) = h_2(t)$ for all t , $H_1 : h_1(t) \neq h_2(t)$ for some t using the log-rank test.

(Optional, PhD required) Please also do the calculation by hand, and check your result.

Problem 2

Consider the kidtran dataset in the KMsurv package where the death times of kidney transplant patients are reported. The patients can be classified by race (1=white and 2=black) and gender (1=male and 2=female) into one of four groups. Compare the survival curves for different races in each sex group.

Problem 3

Consider the larynx data in the KMsurv package. Let

Z1 = 1 if the patient is in stage II, 0 otherwise

Z2 = 1 if the patient is in stage III, 0 otherwise

Z3 = 1 if the patient is in stage IV, 0 otherwise

Z4 = age of the patient (in years):

Fit a proportional hazards model using the covariates Z1, Z2, Z3, Z4 and the interaction term Z1 * Z4. Explain your results. What is the relative risk of dying for a stage II patient of age 50 as compared to a stage I patient of the same age?