

University of California, Davis
Department of Public Health Sciences

Fall 2023

Survival Analysis

BST 222

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Homework Assignment 2

Due October 19, 2023

1. The SSA standard mortality table for 2019 is found at [Mortality Table](#). You will need to select the year 2019 from the dropdown menu instead of the 2020 table which appears at first. Compute the net present value of a series of two payments of \$1000 at the end of year 1 and at the end of year 2, each payment contingent on at least one of two people being alive at the time of the scheduled payment. Individual 1 is male aged 80 and individual 2 is female aged 75. You can assume that the chance of surviving a year at a given age is as given in the table. Use a discount rate of 5%.
2. The data set `tongue` from `KMsurv` is described in KM section 1.11

Description:

The 'tongue' data frame has 80 rows and 3 columns.

Format:

This data frame contains the following columns:

```
type Tumor DNA profile (1=Aneuploid Tumor, 2=Diploid Tumor)
time Time to death or on-study time, weeks
delta Death indicator (0=alive, 1=dead)
```

- (a) Construct and plot the Kaplan-Meier survival function estimates for the two types of tumors, first without the confidence limits and then with the confidence limits.
- (b) Use `survdif` to test the hypothesis that the two true survival curves are the same. Interpret the results.
- (c) Compare the two Kaplan-Meier curves to the Nelson-Aalen estimates graphically. Interpret the results.
- (d) To investigate the proportionality of the two hazard curves, compute and plot the Nelson-Aalen cumulative hazards, the ratio of the cumulative hazards, and the smoothed hazards using `muhaz`. Does it look as if the hazards are proportional?