ST745, Spring 2016

Homework 6 Due: Thursday, 04/07/2016

1. The following small data set contains the survival and covariate information from 4 patients

x	δ	z
2	0	1
5	0	0
2	1	1
3	0	0
1	1	0
4	1	1

where x = time to failure or censoring (you may sort the data by x); δ = failure indicator; 1 = failure, 0 = censored; z = observed value of covariate. Assume a proportional hazards model

$$\lambda(t|z) = \lambda_0(t)\exp(z\beta)$$

(a) Based on this data set, compute the maximum partial likelihood estimator $\hat{\beta}$ using the griding method, and then compute the Breslow estimator $\hat{\Lambda}_0(t)$ of the cumulative baseline hazard function $\Lambda_0(t)$. Plot $\hat{\Lambda}_0(t)$ as a function of time.

Remark: After the last observed failure in the data set, the Breslow estimator remains constant.

(b) Assume the proportional hazards model is correct, plot the estimated survival curve for $S(t|z = 1)$ and $S(t|z = 0)$ as a function of time t on the same graph. Again, please do it by hand.

2. Do problem 8.10 (a), (b) and (c) on page 291, and problem 8.14 (a) on page 293 of the textbook. The bone marrow transplant (BMT) data set can be downloaded from the online link of the book (section 1.3).