ST745, Spring 20116

Homework 4 Due: Tuesday, 03/15/2016

1. Consider the Veterans' administration lung cancer data (the data can be found in R: library(survival) and then data(veteran). There are six covariates collected for each patient: treatment, cell type (four categories which need three dummy variables), Karnofsky score, months from diagnosis, age and indicator of prior therapy. Fit an exponential AFT model to the data with these three covariates in the model. Answer the following questions:

   (a) Compare the mean survival times for two treatments.

   (b) Since the exponential AFT model is also a proportional hazards model, find the estimates and 95% CIs for the hazard ratios comparing two treatments.

2. For the data in (1), fit a Weibull AFT model. Answer the following questions:

   (a) Compare the mean survival times for two treatments.

   (b) Since the Weibull AFT model is also a proportional hazards model, find the estimates and 95% CIs for the hazard ratios comparing two treatments.

3. For the data in (1), fit a log-logistic model and answer the following questions:

   (a) Compare the mean survival times for two treatments.

   (b) Find the estimates and 95% CIs of odds-ratios comparing two treatments.

4. For the data in (1), assume the Gamma AFT model fits the data well. Conduct likelihood ratio test to see if a Weibull model or exponential model or log-logistic model is reasonable.