STAT 425/525 - Homework 11
Due Wednesday, December 7, 2016

A study was conducted on the effects of ploidy on the prognosis of patients with cancers of the mouth. Patients were selected who had a paraffin-embedded sample of the cancerous tissue taken at the time of surgery. Follow-up survival data were obtained on each patient. The tissue samples were examined to determine if the tumor had a aneuploid (abnormal) or diploid (normal) DNA profile. The data set contains `type` with a 1 indicating aneuploid and a 2 indicating diploid tumor types, `time` is survival in weeks post-surgery, and `delta` with a 1 indicating death and 0 indicating censoring. The question of interest is whether or not survival is associated with tumor type. We will examine this question by fitting the Cox proportional hazards model and a Weibull parametric model.

1. Fit a Cox proportional hazards model to these data. Give summary results and interpret the results in terms of the problem. Give both a point estimate and an approximate 95% CI. Assess the adequacy of the proportional hazards assumption. Note that aneuploidy is the reference type.

2. Fit a parametric Weibull model. Again give summary results, interpret the results in terms of the problem giving a point estimate and an approximate 95% CI.

We continue with the tongue cancer survival data.

1. For the Weibull model give an interpretation in terms of the accelerated failure-time model including both the point estimate and an approximate 95% CI. I want you to compare the median survival times in the accelerated failure time representation.

2. Fit a Log-Logistic parameteric model and give an interpretation in terms of the accelerated failure-time model including both the point estimate and an approximate 95% CI.

Based on the above does it appear that ploidy `type` is associated with survival time? Justify your answer.
I did not ask you to check but the Weibull and Log logistic models are pretty comparable in their fits and plots of residual deviances by `type` *did not reveal any problems for either model.*