Homework 6

Problem 1

1. Cancer of Tongue. Sickle-Santanello et al (1988)1 provide data on 80 males diagnosed with cancer of the tongue. Data are provided in the file tongue.csv—dat—xlsx. The variables in the dataset are as follows:
• Tumor DNA profile (1 - aneuploid tumor, 2 - diploid tumor);
• Time to death or on-study time (in weeks); and
• Censoring indicator (0=censored, 1=observed)
Fit the regression with tumor profile as covariate. What is the 95% Credible Set for the slope β_1?

The 95% credible set for β_1 is **[-0.1762, 0.8751]**.

Problem 2

(a) Using OpenBUGS/WinBUGS, fit Y by Poisson regression, with X as a covariate. Report the deviance of your fit.

The deviance is **109.7**.

(b) According to your model, how many packages on average are expected will be broken if the number of shipment routes is X = 4? What is 95% CS for your estimate.

The average number of packages will be broken is **28.57**.
The 95% CS is **[15, 45]**

(c) For a particular shipment sent from Shenzhen you learned that it would involve X = 4 shipping routes. Predict the number of broken packages. What is here different from (b)?

The predicted number of broken packages is **28.6**.
It is very close to the average number of broken packages. They are different by 0.03. Also the 95% CS is wider for the predicted number of broken packages.

(d) What are estimates for unobserved X5, X14, X15, Y1 and Y9?

$X_5 = 1.288$
$X_{14} = 2.551$
$X_{15} = 0.1935$
$Y_1 = 15.74$
$Y_9 = 11.73$