**QUESTION 1**

1. This question is on modelling traffic accident from Week12Lect-3. The number of claims is modelled as a truncated Poisson distribution with parameter . Data for 2020 indicates that a total of  different policy holder made claims, and the total number of claims was 6080. Using the code in the lecture, calculate maximum likelihood estimate of , giving your answer rounded to four decimal places. (Ignore the warning messages.)

0.9052

**1 points**

**QUESTION 2**

1. In Q1, what is the standard error of the estimate? Give your answer rounded to four decimal places.

0.0187

**1 points**

**QUESTION 3**

1. A logistic regression model, M1,  for diabetes (Y or N) in a random sample of patients in a clinic contains the following variables:

Sex (M or F)

Age (continuous)

BMI (continuous)

Ethnic group (categorical, with 5 levels)

Model M2 is the same as M 1, but with Ethnic group omitted. A likelihood ratio test is used to select between the two models. What is the degrees of freedom for the chi squared test statistic?

4

**1 points**

**QUESTION 4**

1. For a chi-squared distribution with 3 degrees of freedom, what is the p-value corresponding to an observed value of 5.3? Give your answer rounded to four decimal places.

0.1511

**1 points**

**QUESTION 5**

1. A model has 5 parameters, and the maximised log-likelihood values is -420. What is the valueof the AIC for this model?

850

> library(stats4)

> minus.ll <- function(lambda){

+ ll<- -4000\*lambda+6080\*log(lambda)-4000\*log(1-exp(-lambda))

+ -ll}

>

> summary(mle(minus.ll,start=list(lambda=2)))

Maximum likelihood estimation

Call:

mle(minuslogl = minus.ll, start = list(lambda = 2))

Coefficients:

Estimate Std. Error

lambda 0.9052409 0.01870428

-2 log L: 4306.421

Warning messages:

1: In log(lambda) : NaNs produced

2: In log(1 - exp(-lambda)) : NaNs produced

3: In log(lambda) : NaNs produced

4: In log(1 - exp(-lambda)) : NaNs produced

5: In log(lambda) : NaNs produced

6: In log(1 - exp(-lambda)) : NaNs produced

7: In log(lambda) : NaNs produced

8: In log(1 - exp(-lambda)) : NaNs produced

9: In log(lambda) : NaNs produced

10: In log(1 - exp(-lambda)) : NaNs produced

> p\_value <- 1 - pchisq(5.3, df = 3)

> p\_value

[1] 0.1511024

> AIC <- -2\* (-420) + 2\* 5

> AIC

[1] 850