FALL 2023   MATH 484/564   HOMEWORK #6

Problem 1 Exercise 12.4 from the TEXT (Table 12.15 attached).

Problem 2 Exercise 12.6 from the TEXT (Tables 12.6 and 12.7 attached).

Problem 3 Exercise 13.1 from the TEXT (Table 6.6 attached).

Problem 4 Exercise 13.4 from the TEXT (Table 6.17 attached).

Problem 5 Consider the Annual dues dataset (attached). The board of directors of a professional association conducted a random sample survey of 30 members to assess the adverse effects of dues increase. X denotes the dollar amount increase in annual dues, and $Y = 1$ indicate the membership will not be renewed after the increase at this amount and $Y = 0$ if the membership will be renewed.

The simple logistic regression model is used to fit the data.

1) Find the MLE of β_0 and β_1, and state the fitted response function.

2) Plot the data and the fitted response function, state if the fitted response function appears to fit the data well.

3) If the dues are increased by $\$40$, what is the probability that the members will not renew their membership?

4) Estimate the amount of dues increase for which 75% of the members are expected to not to renew their membership.

5) For every dollar increase in the dues, how will the increase affect the $\text{Prob}(Y = 1)$, the probability of members not renewing their membership?

6) Fit a Poison regression model to the data. State the fitted response function. Which model gives a better fit?