Statistical Modelling Final Assignment

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Part A

Part B

B.2: Simulation Study for Poisson Regression

This part involves conducting a simulation study that compares AIC, BIC and TIC for Poisson regression. Five variables, $x_{i,j}$, $j = 2, \ldots, 6$, $i = 1, \ldots, n$ were sampled from Uniform(-1,1). The response variable Y was sampled from Poisson(μ_i) with

$$\mu_i = \exp\left(\frac{1}{3} + \frac{2}{3}x_{i,2} + 1 * x_{i,3} + \frac{4}{3}x_{i,4} + 0 * x_{i,5} + 0 * x_{i,6}\right)$$

The response vector is n x 1 and the design matrix is an n x 6 matrix with the first column containing the intercept (all 1's) and the rest of the columns containing the x_j's. Furthermore, we construct models with all the possible combinations of the covariates (which for 5 covariates results in $2^5 = 32$ models) and keeping the intercept term in each of the models.

This simulation is run 1000 times for two sample sizes, $n = 50$ and $n = 400$. The aim is to see which models are selected and with what frequency by AIC, BIC and TIC. The results are presented below.

Model	AIC	BIC	TIC

Part C

Appendix