

MTH 372: Assignment I

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Instructions

- Use statistical software R for your codes and only basic in built functions are allowed.
- Due date is February 14, 2019 (6 p.m.). No late assignments will be accepted.
- Submit all of your work which include the codes, results and graphs.
- Follow the labelling method for your files.

1. (5 points) Suppose on flipping an unbiased coin we observe 0, 1, 1, 0, 0, 1, 1, 0, 0, 1.

- (a) Calculate the estimate of the unknown parameter using method of moments.
- (b) Find the maximum likelihood estimate of the unknown parameter.
- (c) Obtain the maximum likelihood estimate in R.
- (d) Compare the estimates obtained by the above methods.

2. (5 points) The following data are the number of days it took for rats painted with a carcinogen to develop carcinoma

143, 164, 188, 188, 190, 192, 206, 209, 213, 216, 220, 227, 230, 246, 265, 304, 234.

Suppose the data could be modeled as Weibull (c, σ) distribution. The pdf is given by

$$f_{c,\sigma}(x) = \frac{c}{\sigma} \left(\frac{x}{\sigma} \right)^{c-1} e^{-(x/\sigma)^c}, \quad x > 0, \quad c > 0, \quad \sigma > 0.$$

- (a) Derive the maximum likelihood estimator (MLE) of (c, σ) .
 - (b) Construct a code in R to get the maximum likelihood estimate of the unknown parameters for the data.
3. (5 points) Question 7.28 from Statistical Inference by Casella and Berger (2nd Edition).