

## Fifth Lab Assignment (Due by 3pm on Apr. 22)

Reference MATLAB tutorial and MATLAB lab demonstrations.

### Lab assignments

**Assignment 1** Suppose that the number of customers visiting a store in a day can be modeled as a Poisson process. Now, we have a dataset *poiss2.mat*<sup>1</sup>, which contains such yearly records for this store. Now,

- Please estimate the intensity  $\lambda$  for this Poisson process,
- How about the number of customers visiting this store in a week? Please also estimate its intensity parameter  $\hat{\lambda}$ .
- Please generate 100 weekly records for this store. You can randomly generate 100 numbers from such a Poisson distribution,  $Poiss(\hat{\lambda})$ . Please save those records in a mat file (e.g., *poiss100.mat*).

**Assignment 2** Let the random variable  $X$  follow an Exponential distribution such that  $X \sim Exp(\lambda)$ . Please download the dataset, *exp.mat* *here*<sup>2</sup>. This dataset contains 500 samples as the realization of  $X$ . Please empirically estimate  $\lambda$  by using those samples. Let the random variable  $Y = 2X$ . What kind of specific distribution  $Y$  should have and how to compute its parameters. Based on the computed parameters, please randomly generate 100 samples as the realization of  $Y$  from its distribution. Please save those 100 samples into a mat file (e.g., *exp100.mat*).

**Assignment 3** For the Iris dataset which you can download *here*<sup>3</sup>. please calculate covariance among first columns and plot a scatter plot for each of the two columns among first four columns in the data. The plot should look like the one that MATLAB function `corrplot()` produces and should contain value of correlation as well.

---

<sup>1</sup>[http://astro.temple.edu/~tuf28053/CIS2033\\_Spring2015/lab\\_assignments/poiss2.mat](http://astro.temple.edu/~tuf28053/CIS2033_Spring2015/lab_assignments/poiss2.mat)

<sup>2</sup>[http://astro.temple.edu/~tuf28053/CIS2033\\_Spring2015/lab\\_assignments/exp.mat](http://astro.temple.edu/~tuf28053/CIS2033_Spring2015/lab_assignments/exp.mat)

<sup>3</sup>[http://astro.temple.edu/~tuf28053/CIS2033\\_Spring2015/lab\\_assignments/iris.data](http://astro.temple.edu/~tuf28053/CIS2033_Spring2015/lab_assignments/iris.data)