# *Practice 3*

## Exercise 1: Understanding of hist.m function

a) Generate sample data as follows:

```
rand('seed',0);
X = fix(rand(1,30)*100);
```

b) How many values contain the intervals [0-9], [10-19], [20-29] … [90-99]?

c) Analyze what the follow instructions do:

```
hist(X)
[a,b] = hist(X)
a = hist(X,5:10:95);
[a,b] = hist(X,5:10:95);
```

d) What do the first and last bins of histogram represent?

e) What is the value of sum(a)?

f) How can I transform the histogram values to probabilities? That is, what is the probability of select an element randomly and find it into the histogram bins?

g) What is the sum of all probabilities?

h) Generate 1000 sample data like the section a). What happens if the number of bins is too large or too small?

i) Generate 100000 sample data like the section a). Determine an optimal number of bins and observe the histogram. What happens?

## Exercise 2: Uniform and Normal (Gaussian) distributions

a) Generate 100000 sample data using an Uniform distribution and another 100000 sample data using a Normal distribution as follows:

```
X = rand(1,100000);
Y = randn(1,100000);
```

b) Obtain their histograms and analyze both distribution in sense of the histogram form, mean, data range, sum of histogram values, minimum and maximum of samples data and the highest bin of histogram. Repeat the previous point several time, if necessary.

c) Determine the mean and the standard deviation of Y distribution using the mean() and std() Matlab functions.

d) Find the values from Y (percent) that are contained into the intervals defined as [m-s,m+s], [m-2s,m+2s], [m-3s,m+3s].