Tutorial 05

L09 – Data export and import

L10 – Graphics - Plots

Exercise

- A dataset of about 400 cars with 8 characteristics such as horsepower, acceleration, etc is available in .CSV file

- The **cars.csv** file is uploaded in **M Files** folder in Teams.

- Download the file and do the exercises discussed in the next slide.

Exercise

1. Read the contents of “cars.csv” into a MATLAB TABLE named **CarsData**.

2. Display all the variable names in **CarsData** Table.

3. List all the Car names in an **alphabetical** order.

4. **Count** the number of cars in the Table

5. Find the Car Name that gives **highest** MPG (Miles-Per-Gallon)

Exercise

6. What is the average MPG of all Cars?

7. List all the Car names that have MPG less than the average MPG of all Cars.

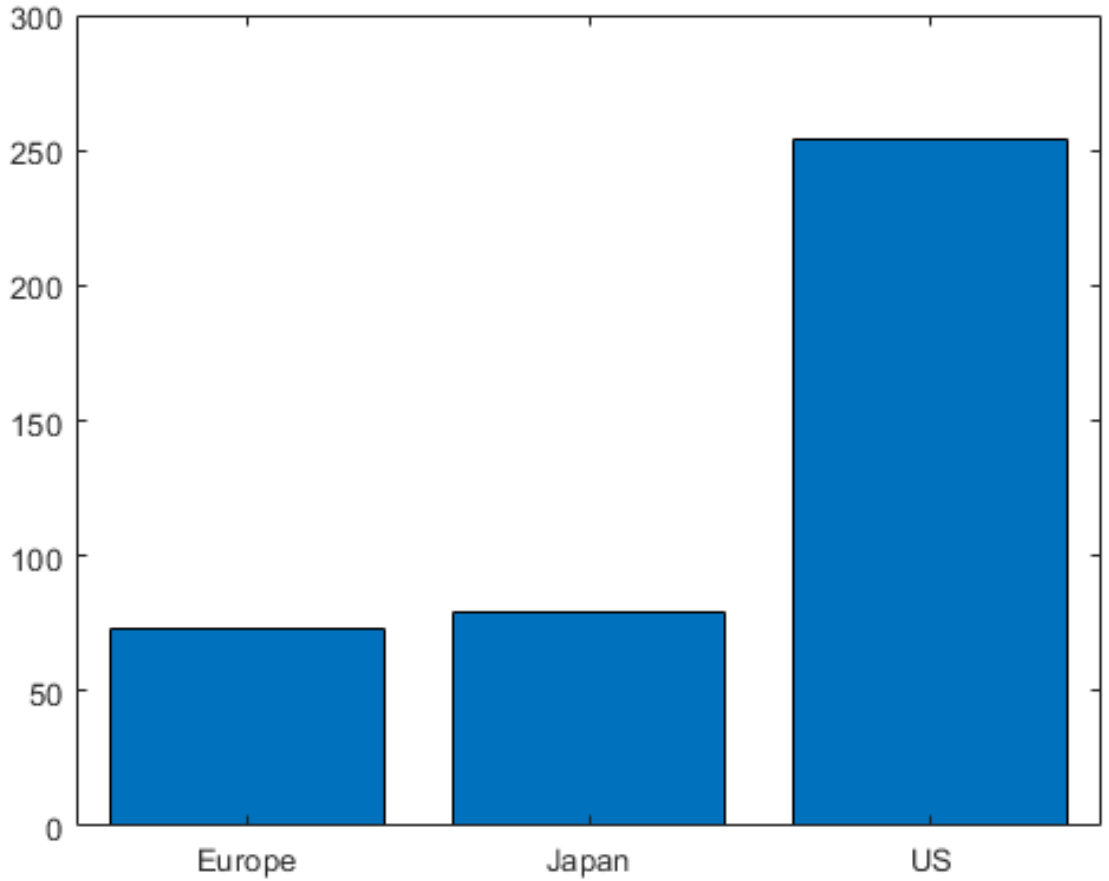
8. List all the Cars with model number greater than 80 and manufactured by Japan

9. List all the countries of origin who have manufactured cars with 6 cylinders.

10. Count the number of cars manufactured by each country between the years 72 and 76 with both years included.

Exercise

- Refer : **cars.csv**.
- Write MATLAB code to plot a bar chart showing the number of cars manufactured by different countries.



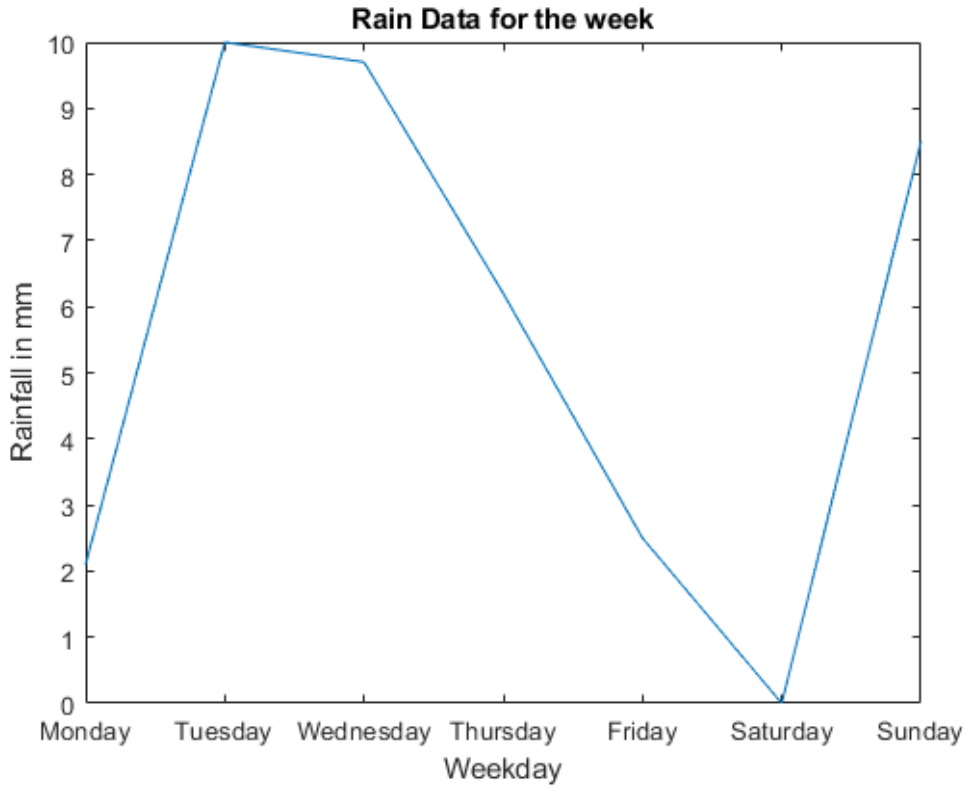
Exercise

- Find all cars manufactured by US in the year 1978 and **write** the all information related to them into a CSV file titled “**US_cars.csv**”.

Exercise

Given the following rain data for a given Week (Monday to Sunday): Plot these values using MATLAB:

Give labels and title to the plot



Day	Rain amount
Monday	2.1 mm
Tuesday	10 mm
We dnesday	9.7 mm
Thursday	6.2 mm
Friday	2.5 mm
Saturday	0 mm
Sunday	8.5 mm

Plotting of dynamic system

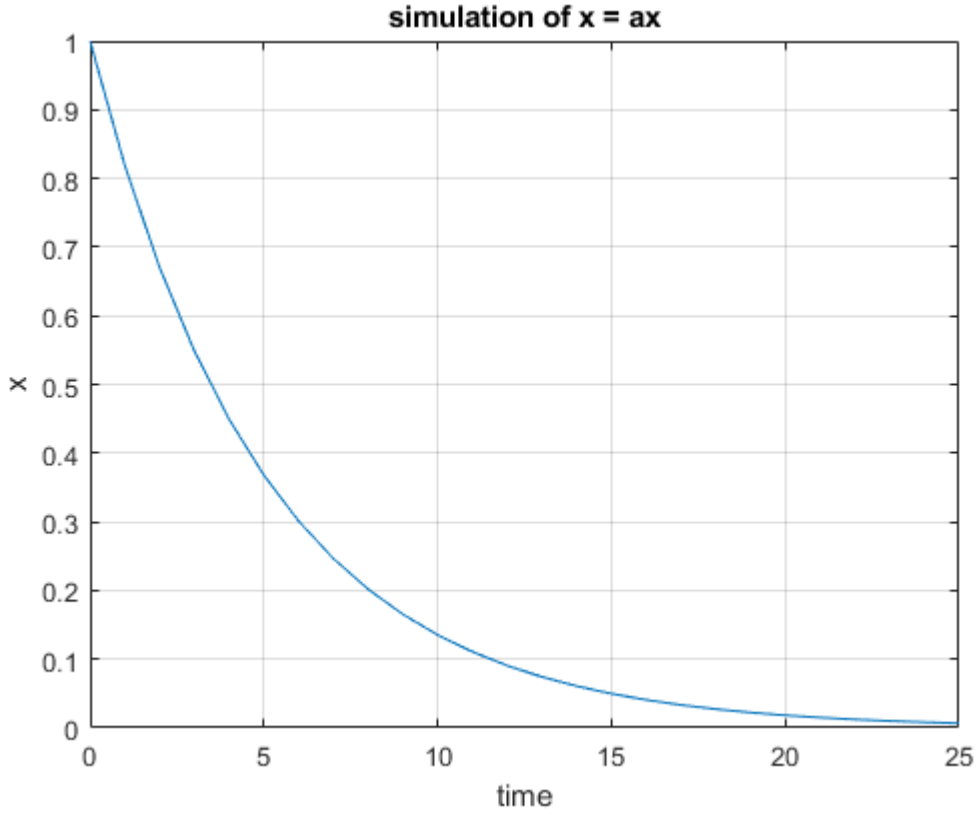
Given the autonomous system (differential equation): $\dot{x} = ax$, where a= - $\frac{1}{T}$, where T is the time constant.

The solution for the differential equation is: $x(t) = e^{at}x_0$

Set T = 5 and the initial condition $x(0)$= 1

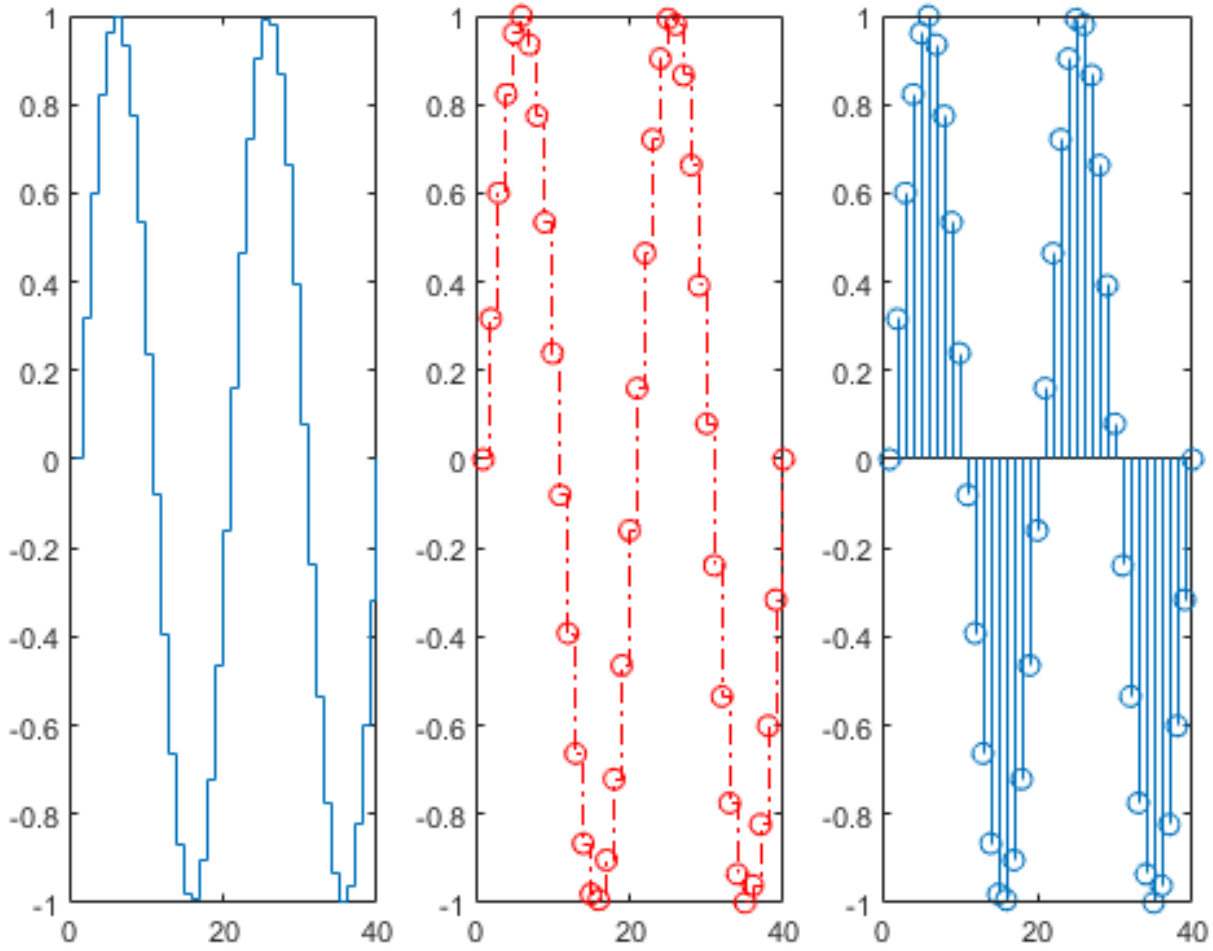
Create a Script in MATLAB (.m file) where you plot the solution $x(t)$ in the time interval 0 ≤ t ≤ 25

Add Grid, and proper Title and Axis Labels to the plot



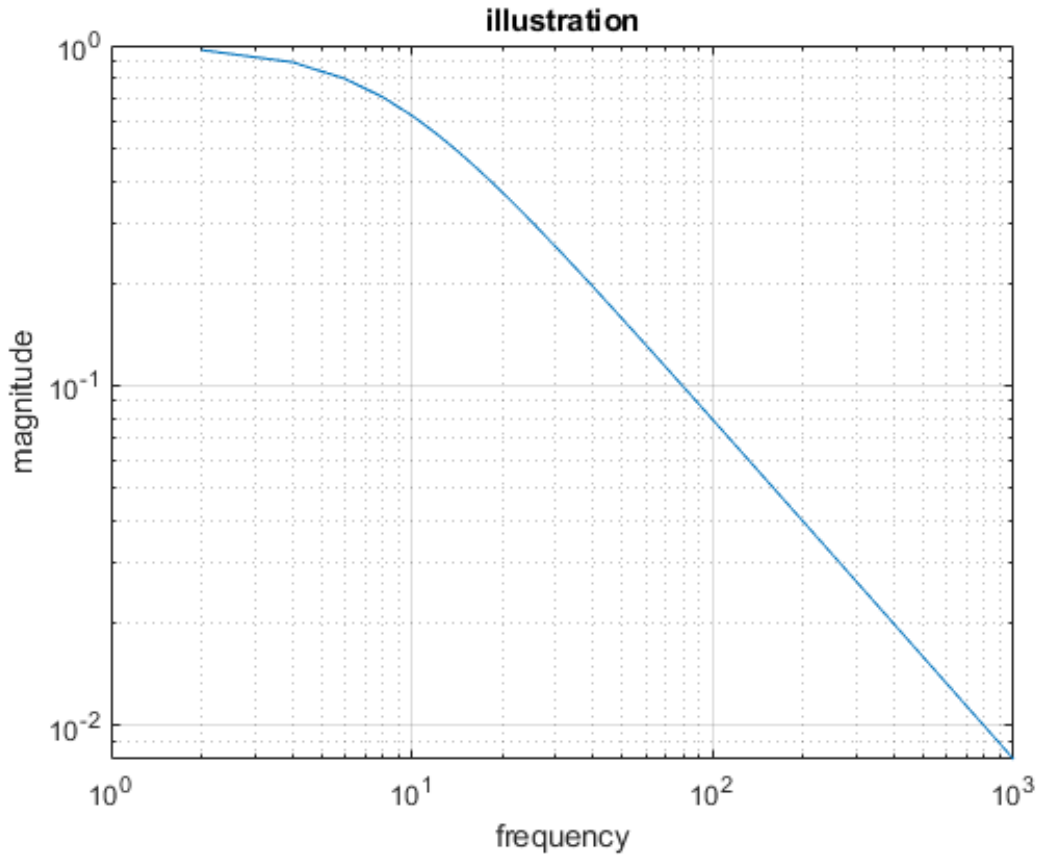
Exercise

- Create a stairstep plot of sine evaluated at 40 equally spaced values between 0 and 4*π*.
- Plot the same stairstep plot setting the line style to a dot-dashed line, the marker symbol to circles, and the color to red.
- Also plot a stem graph of the same data.
- Plot these as subplots within a main plot.



Exercise

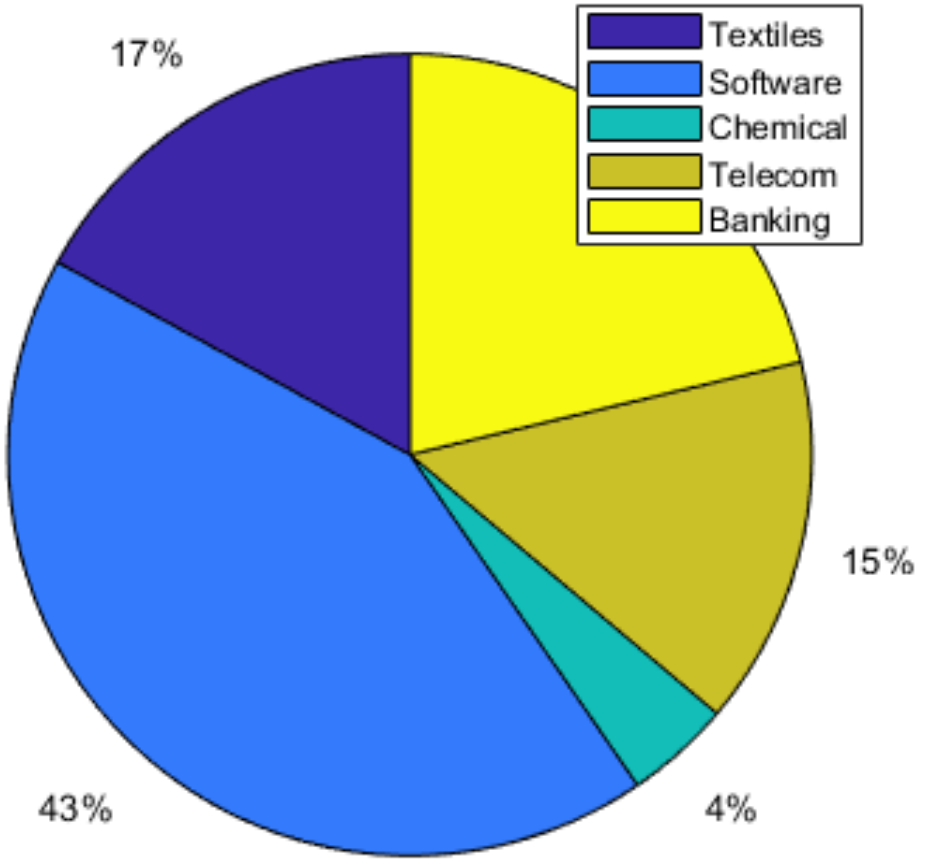
- Plot magnitude versus frequency on log-log scale for the transfer function G(s)= $\frac{1}{1+0.02s}$, where s=jw=j2πf and f is the frequency
- f ranges from 0 1000 Hz



Exercise

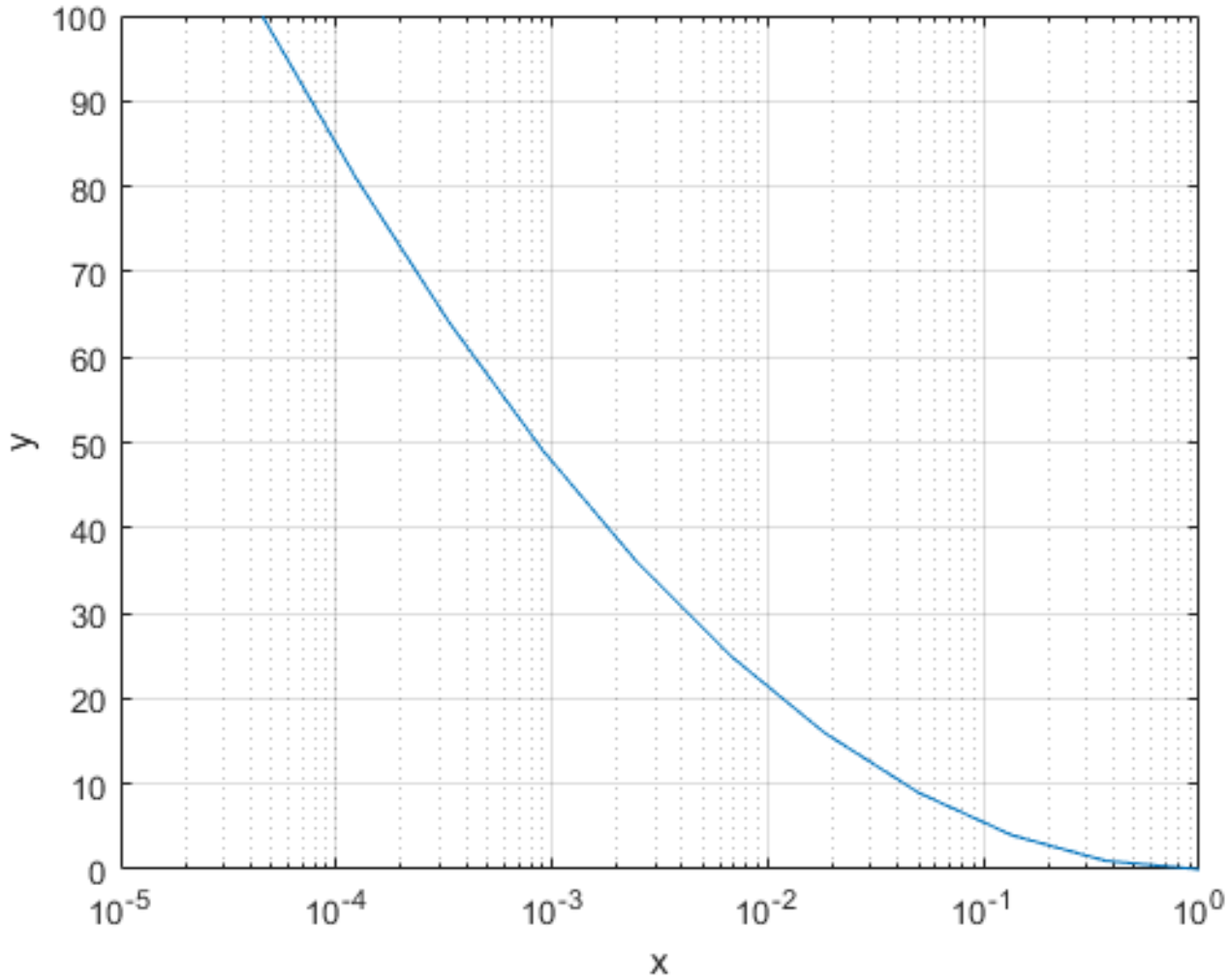
- Illustrate the use of pie function to show the concentration of different industries in the region as per the following data. Include legends.

Industry	Number of Units
Textile	8
Software	20
Chemical	2
Telecom	7
Banking	10



Exercise

- Plot function $x = e^{-a}$, $y = a^2$ where $0 <= a <= 10$, using semilogx function (Use semilogx(x,y))



Exercise

- Plot power versus time for 0<t<20 sec, with power on the log scale and time in the linear scale for a motor whose performance equations are given as follows:

  Rotational speed, $w = 190(1-e^{-0.15t})$

  Torque, $T = 8e^{-0.15t}$

  Power $= w \times T$