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MATLAB
Unit 4-Lecture 14

BTech (CSBS) -Semester VII

2 September 2022, 09:35AM

*few figures/content have been prepared/referred from internet source/books

Basic plotting

- Overview,
- axis labels, and annotations,
- creating simple plots,
- specifying line styles and colours
- adding titles,
- multiple data sets in one plot,

fplot

- fplot(@fun, lims) - plots the function fun between the x-axis limits
- lims = [xmin xmax ymin ymax] – axis limits
- The function fun(x) must return a row vector for
- each element of vector x.

AXIS Control

1. axis scaling and appearance.
2. axis([xmin xmax ymin ymax])
3. Sets scaling for the x- and y-axes on the current plot.
4. axis auto - returns the axis scaling to its default, automatic mode
5. axis off - turns off all axis labeling, tick marks and background.
6. axis on - turns axis labeling, tick marks and background back on.
7. axis equal – makes both axes equal length

3D Plot

The general syntax for the plot3 command is

```
plot3(x, y, z, 'style-option')
```

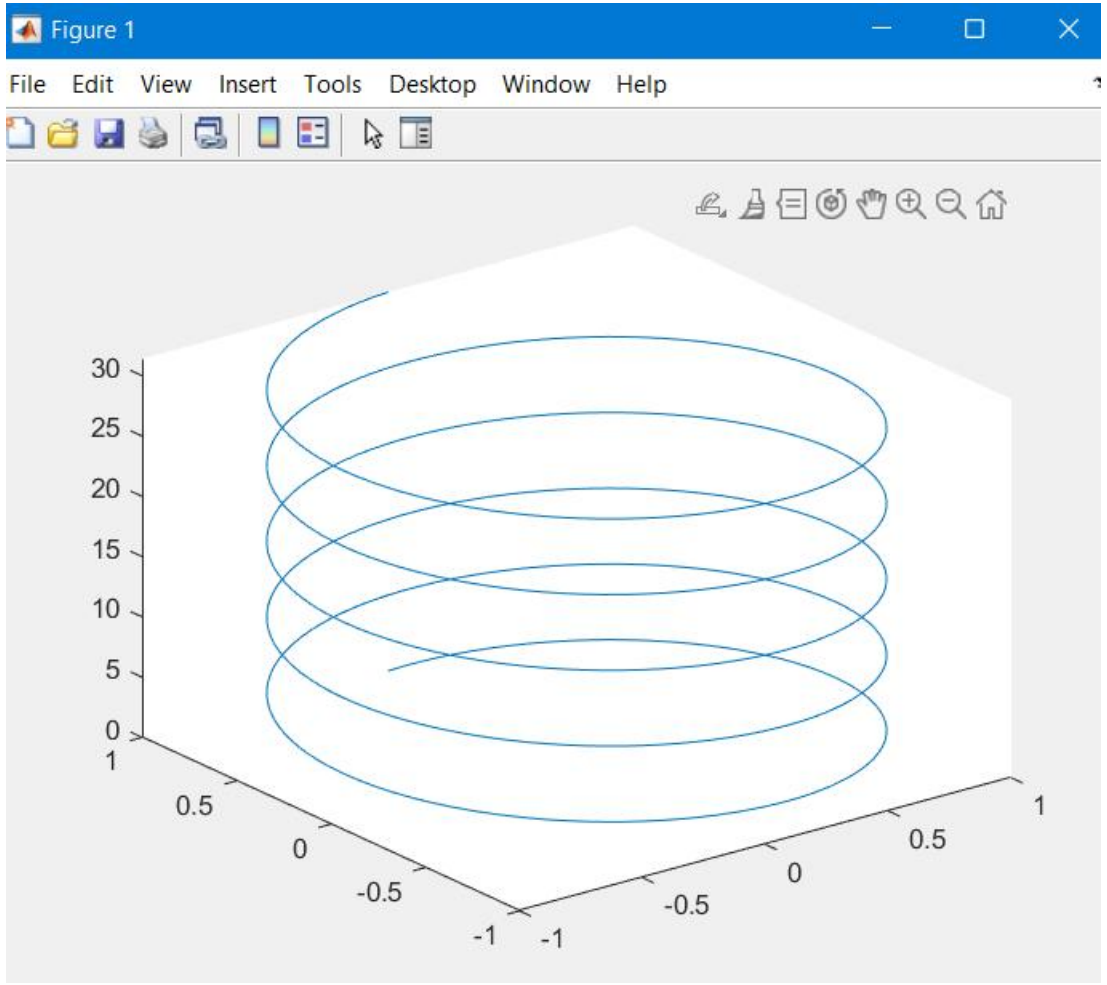
`plot3`	plots curves in space,
`stem3`	creates discrete data plot with stems in 3-D,
`bar3`	plots 3-D bar graph,
`bar3h`	plots 3-D horizontal bar graph,
`pie3`	makes 3-D pie chart,
`comet3`	makes animated 3-D line plot,
`fill3`	draws filled 3-D polygons,
`contour3`	makes 3-D contour plots,
`quiver3`	draws vector fields in 3-D,
`scatter3`	makes scatter plots in 3-D,
`mesh`	draws 3-D mesh surfaces (wire-frame),

3D Plot

`meshc`	draws 3-D mesh surfaces along with contours,
`meshz`	draws 3-D mesh surfaces with reference plane curtains,
`surf`	creates 3-D surface plots,
`surfc`	creates 3-D surface plots along with contours,
`surfl`	creates 3-D surface plots with specified light source,
`trimesh`	mesh plot with triangles,
`trisurf`	surface plot with triangles,
`slice`	draws a volumetric surface with slices,
`waterfall`	creates a *waterfall* plot of 3-D data,
`cylinder`	generates a cylinder,
`ellipsoid`	generates an ellipsoid, and
`sphere`	generates a sphere.

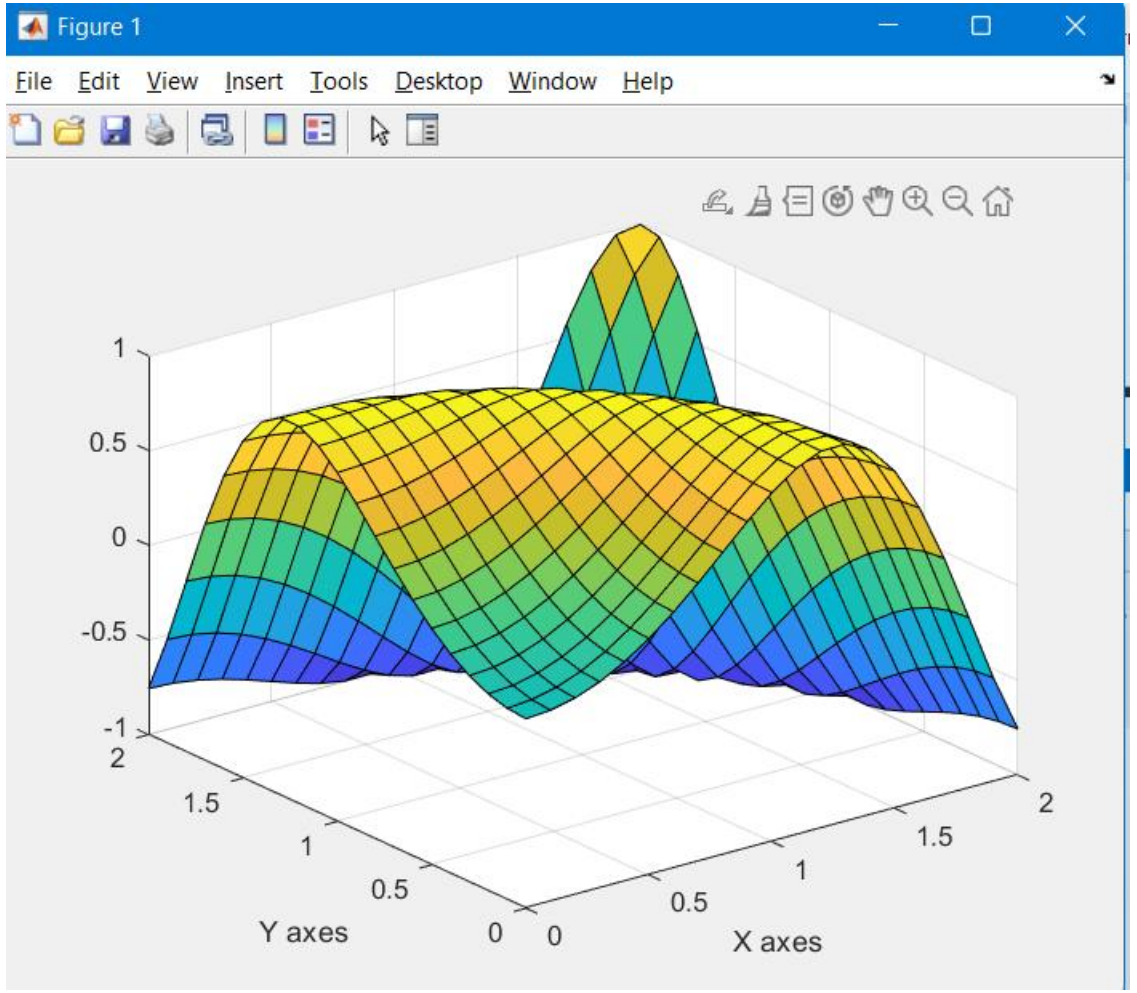
3D Plot: Question 1

```
23    t = 0:pi/50:10*pi;
24    plot3(sin(t),cos(t),t)
25
```



Surface Plot: Question 2

```
26  x = 0:0.1:2;
27  y = 0:0.1:2;
28  [xx, yy] = meshgrid(x,y);
29  zz=sin(xx.^2+yy.^2);
30  surf(xx,yy,zz)
31  xlabel('X axes')
32  ylabel('Y axes')
```

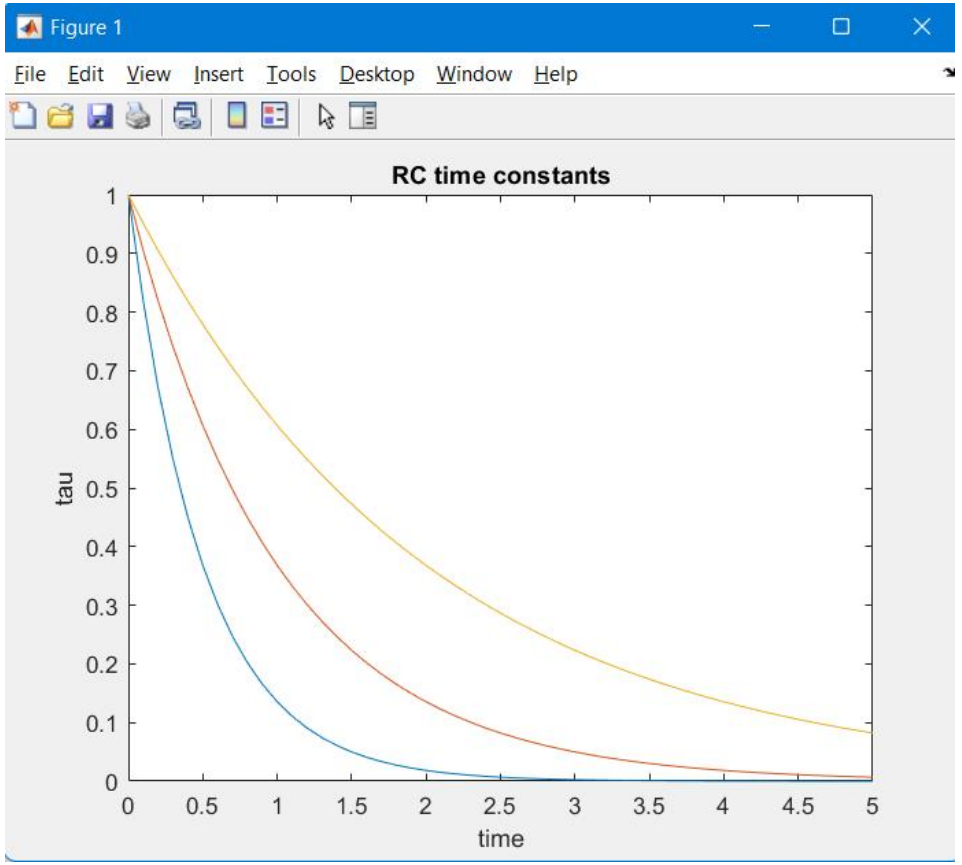


Question 3

Plot voltage vs time for various RC time constants

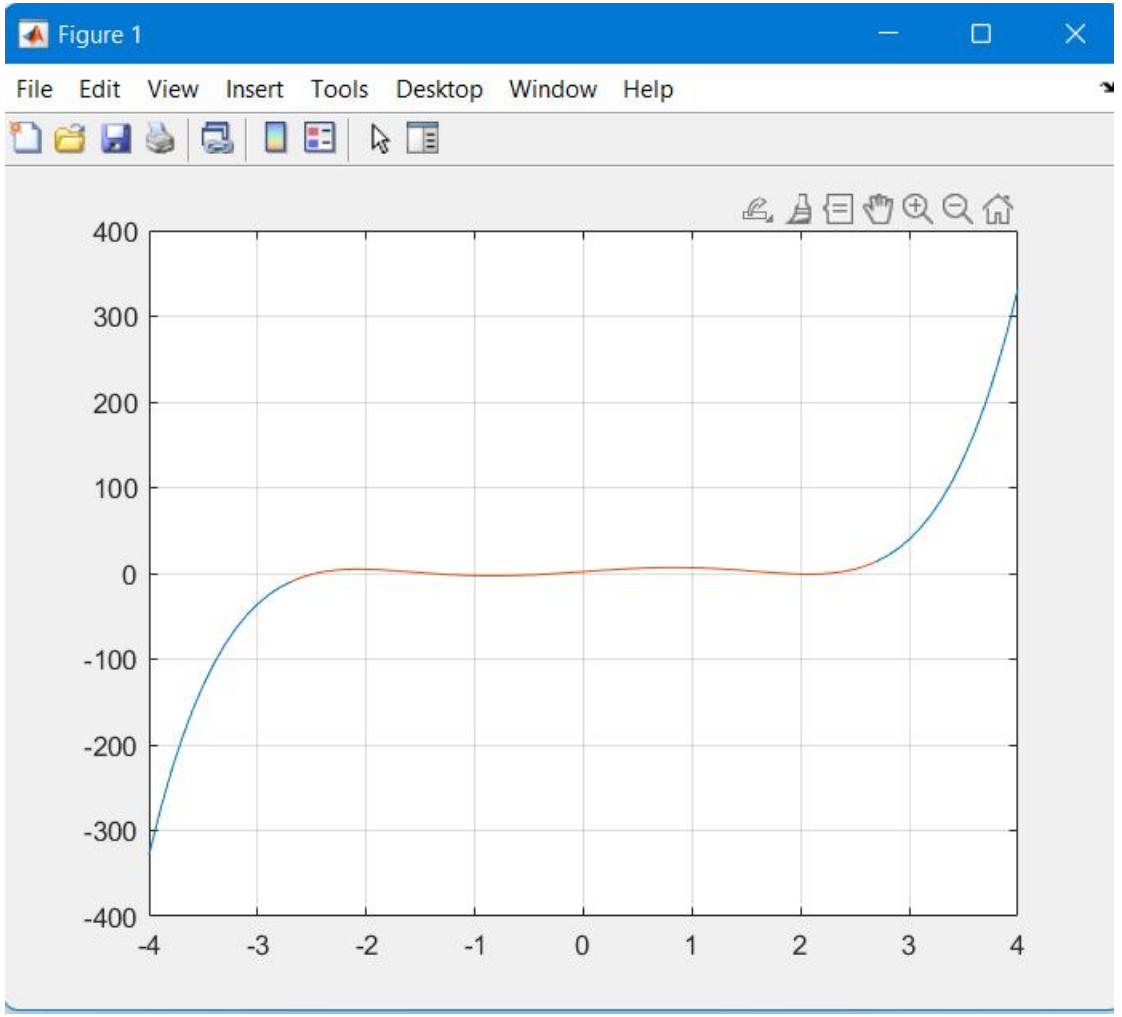
$$\frac{\vartheta}{V} = e^{-t/\tau}$$

```
34    time = 0:0.1:5;
35    tau = [0.5 1.0 2.0];
36    [TIME TAU] = meshgrid(time,tau);
37    V = exp(-TIME./TAU);
38    plot(time,V)
39    xlabel('time')
40    ylabel('tau')
41    title('RC time constants')
```



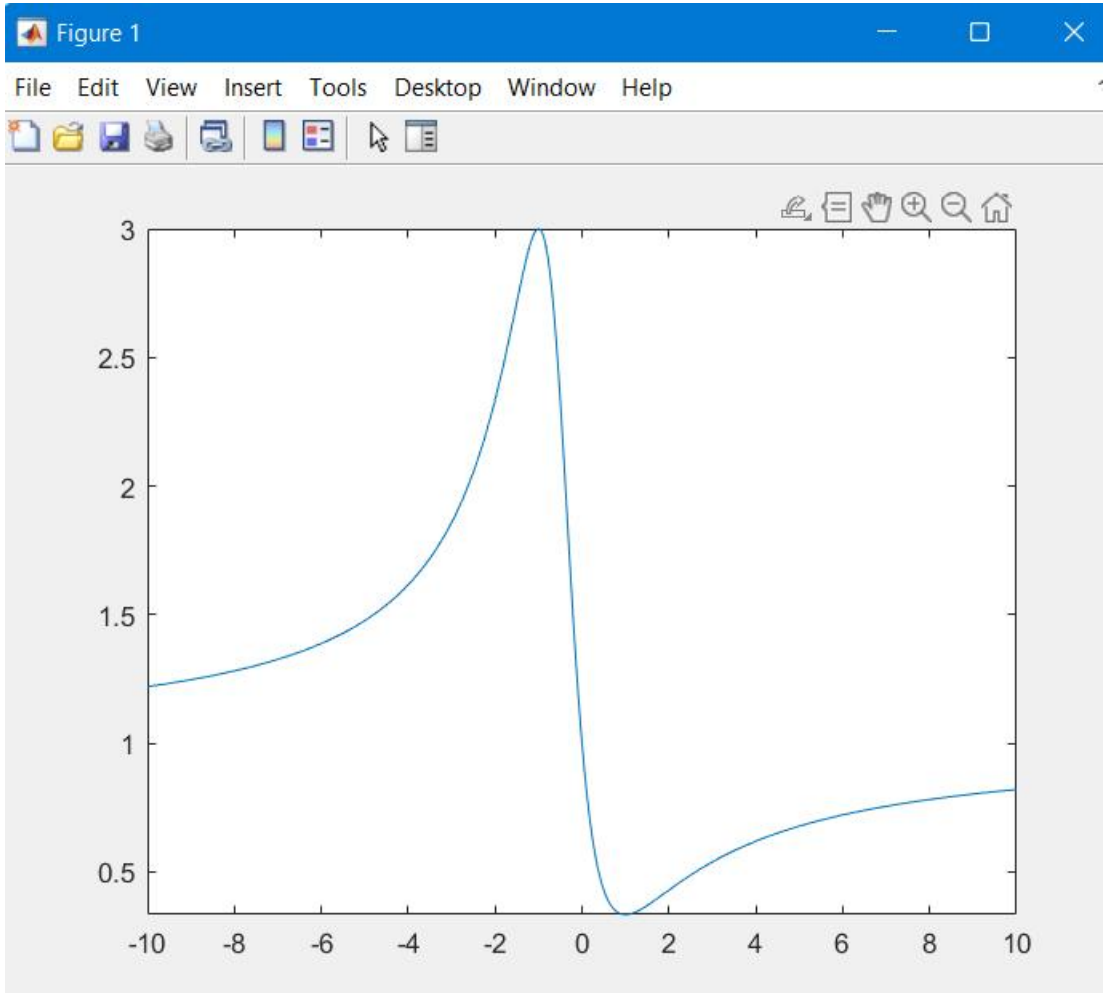
Question 4

```
43    x1=-4:0.1:4;
44    x2 = -2.7:0.1:2.7;
45    f1 = 0.6*x1.^5-5*x1.^3+9*x1+2;
46    f2= 0.6*x2.^5-5*x2.^3+9*x2+2;
47    plot(x1,f1,x2,f2)
48    grid on
```



Question 5

```
50    f=@(x)(x^2-x+1)/(x^2+x+1);
51    l=[-10 10];
52    fplot(f,l)
```



Question 6

```
54    RL = 1:0.01:10;
55    Vs = 12;
56    Rs = 2.5;
57    P = (Vs^2*RL)./(RL+Rs).^2;
58    plot(RL,P)
59    xlabel('Load resistance')
60    ylabel('Power dissipated')
```