MTP 290 Computing Laboratory Assignment-I

1. Write the function that will accept a complex number c and plot that point on a Cartesian coordinate system with a circular marker. The plot should include both the x and y axes,plus a vector drawn from the origin to the location of c.

2. Plot the function $v(t) = 10e^{(-0.2+j\pi)t}$ for $0 \leq t \leq 10$ using the function $plot(t, v)$. What is displayed on the plot? Also check for the function $plot(v)$.

3. Create a polar plot of the function $v(t) = 10e^{(-0.2+j\pi)t}$ for $0 \leq t \leq 10$.

4. Plot the function $v(t) = 10e^{(-0.2+j\pi)t}$ for $0 \leq t \leq 10$ using function $plot3$, where the three dimensions to plot are the real part of the function,the imaginary part of the function and time.

5. Euler's equation defines e raised to an imaginary power in terms of sinusoidal functions as follows
   $e^{i\theta} = cos\theta + isin\theta$
   Create a two dimensional(2D) plot of this function θ varies from 0 to 2π.
   Create three dimensional(3D) line plot using a function $plot3$ as θ varies from 0 to 2π.

6. Create the mesh plot, surface plot and contour plot of the function $z = e^{x+iy}$ for the interval $-1 \leq x \leq 1$ and $-2\pi \leq y \leq 2\pi$. In each case, plot the real part of the z versus x and y.

7. Plot the function $y = e^{-x}sinx$ for $x \in [0, 2]$ in step of 0.1.
   Create the following plot types:
   (a) stem plot (b) stair plot (c) bar plot and (d) compass plot. Be sure to include titles and axis labels on all plots.

8. Suppose the George, Sam, Betty, Charlie and Suzie contributed \$5, \$10, \$7 and \$15 respectively to a colleague's going-away present. Create a pie chart of their contributions. What percentage of the gift was paid for by Sam?

9. Plot the function $f(x) = 1/\sqrt{x}$ over the range $0.1 \leq x \leq 10.0$ using function $fplot$. Be sure to label your plot properly.

10. Write a script file to draw a filled circle and view it in 3D.

11. Write a script file to generate and plot the surface $z = xy(x^2 - y^2)/(x^2 + y^2)$ using $meshgrid$ and $mesh$ command.

12. Plot the parametric space curve
$x(t) = t$, $y(t) = t^2$, $z(t) = t^3$
$0 \leq t \leq 1$.

13. Plot the filled polygons with three vertices each.

14. Plot the surface $z = -cosx\ cosy\ e^{-\sqrt{x^2+y^2}/4}$ $|x| \leq 5$, $|y| \leq 5$
using $surf$, $surfc$ and $surf1$.

15. Plot the discrete data with stems
$x = t$, $y = tsin(t)$, $z = e^{t/10} - 1$ for $0 \leq t \leq 6\pi$.

16. Plot 2D curve as ribbons in 3D
$y_1 = sin(t)$, $y_2 = e^{-.15t}sin(t)$, $y_3 = e^{-.8t}sin(t)$ for $0 \leq t \leq 5\pi$.

17. Plot an ellipsoid of radii $rx = 1$, $ry = 2$, and $rz = 0.5$ centerd at the origin.

18. Plot a cyclinder generated by $r = sin(3\pi z) + 2$
$0 \leq z \leq 1$, $0 \leq \theta \leq 2\pi$.

19. Write a script to generate an interpolated surface $z = 3/(1 + x^2 + y^2)$ and $-1 < x < 1$ and $-1 < y < 1$.

20. Generate a script file to animate a bar pendulam swings in 2D.