

Solution of Laboratory Work 6

Exercise 1:

```
// 1. Draw the curve  $y(x) = x \sin(x)$  on  $[0,10]$  with  
step 0.05  
  
x = 0:0.05:10;  
  
y = x .* sin(x);  
  
plot(x, y);  
  
xlabel("Plot of  $y(x) = x \sin(x)$ ", "x", "y");  
  
// 2. Plot the same curve three times in succession  
  
clf(); // Clear the graphics window  
  
x = 0:0.05:10;  
  
y = x .* sin(x);  
  
// a) in green  
  
plot(x, y, 'g');  
  
xlabel("Same curve in different styles", "x", "y");  
  
xgrid();  
  
sleep(1000); // short pause before next plot  
  
// b) with markers  
  
clf();  
  
plot(x, y, 'o');
```

```

xtitle("Curve with markers", "x", "y");

xgrid();

sleep(1000);

// c) red dashed line

clf();

plot(x, y, 'r--');

xtitle("Red dashed curve", "x", "y");

xgrid();

// 3. Superimpose the curves  $y = x$  and  $y = x \sin(x)$ 

clf();

y1 = x;

y2 = x .* sin(x);

plot(x, y1, 'b', x, y2, 'r--');

xtitle("Superimposed Curves", "x", "y");

xgrid();

// 4. Use the zoom tool manually from the Tools menu

// (no code needed – user action)

// 5. Add a legend to the most recent plot

legend(["y = x", "y = x sin(x)"], "in_upper_left");

```

Exercise 2:

```

// 1. Plot the surface  $z(x,y) = x^4 - y^4$  using
fplot3d
def f('z = F(x,y)', 'z = x.^4 - y.^4'); // Define the
function
x = -3:0.3:3;

```

```

y = x;
clf(); // Clear current figure
fplot3d(x, y, F);
xlabel("Surface z(x,y) = x^4 - y^4 using fplot3d",
"x", "y", "z");
// Use Tools • 2D/3D Rotation to change the viewing
angle manually
// 2. Compute the matrix Z using feval and redraw the
surface with surf
[X, Y] = ndgrid(x, y); // Create the coordinate
grids
Z = feval(F, X, Y); // Evaluate z = F(x,y) at all
points
fplot3d(X, Y, Z);
clf(); // Clear the window before redrawing
surf(x, y, Z);
xlabel("Surface z(x,y) = x^4 - y^4 using surf", "x",
"y", "z");
xgrid();

```

Exercise 3:

```

// Divide the window into two sub-windows to display
D1 and D2

clf();

// --- Left subplot: D1 (superimposed curves from
Exercise 1) ---
subplot(1,2,1);
x1 = 0:0.05:10;
y1 = x1;
y2 = x1 .* sin(x1);
plot(x1, y1, 'b', x1, y2, 'r--');
xlabel("D1: y = x and y = x sin(x)", "x", "y");

```

```

xgrid();
legend(["y = x", "y = x sin(x)", "in_upper_left"]);

// --- Right subplot: D2 (surface from Exercise 2) ---
subplot(1,2,2);
x2 = -3:0.3:3;
y2 = x2;
def('z = F2(x,y)', 'z = x.^4 - y.^4');
Z2 = feval(X2, Y2, F2);
fplot3d(x2, y2, Z2);
xtitle("D2: Surface z(x,y) = x^4 - y^4", "x", "y",
"z");
xgrid();

```