

처음 배우는 매트랩

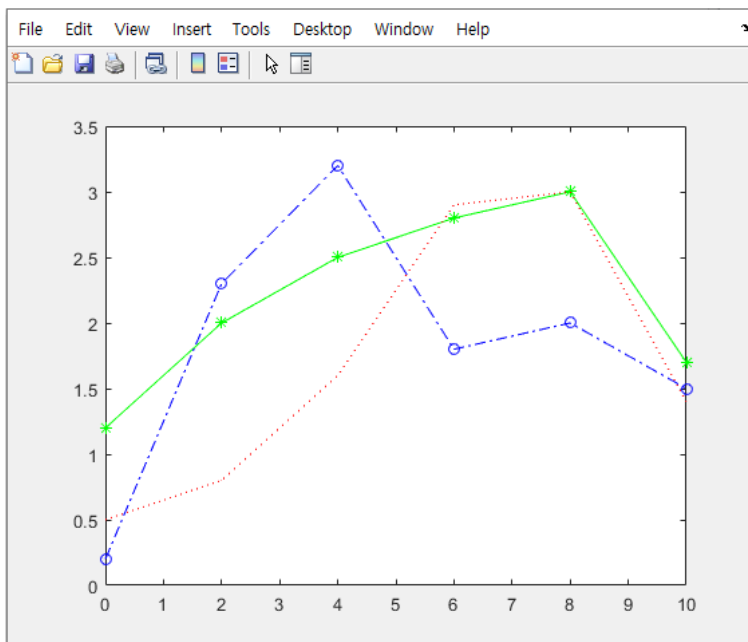
[연습문제 공개용 답안 이용 안내]

- 본 연습문제 및 해답의 저작권은 방성완과 한빛아카데미(주)에 있습니다.
- 이 자료를 무단으로 전제하거나 배포할 경우 저작권법 136 조에 의거하여 최고 5 년 이하의 징역 또는 5 천만원 이하의 벌금에 처할 수 있고 이를 병과(併科)할 수도 있습니다.

Chapter 05 연습문제

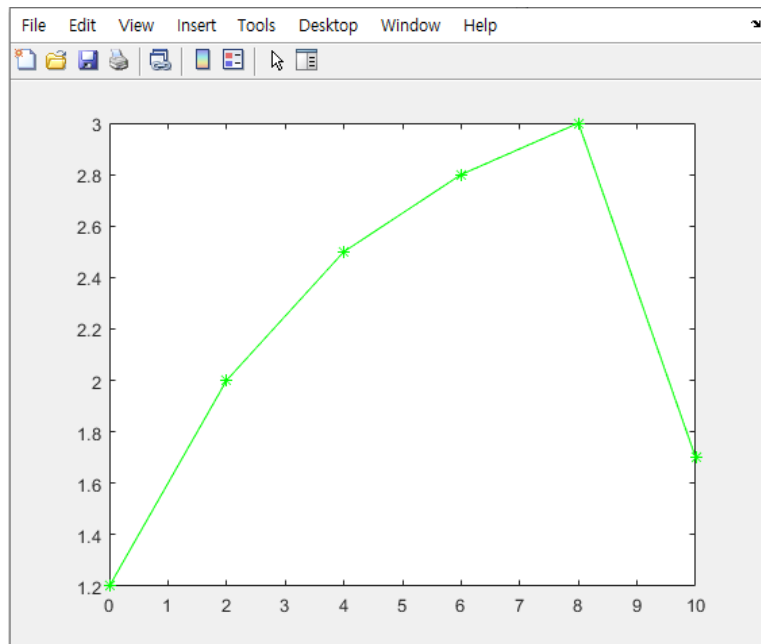
5.1

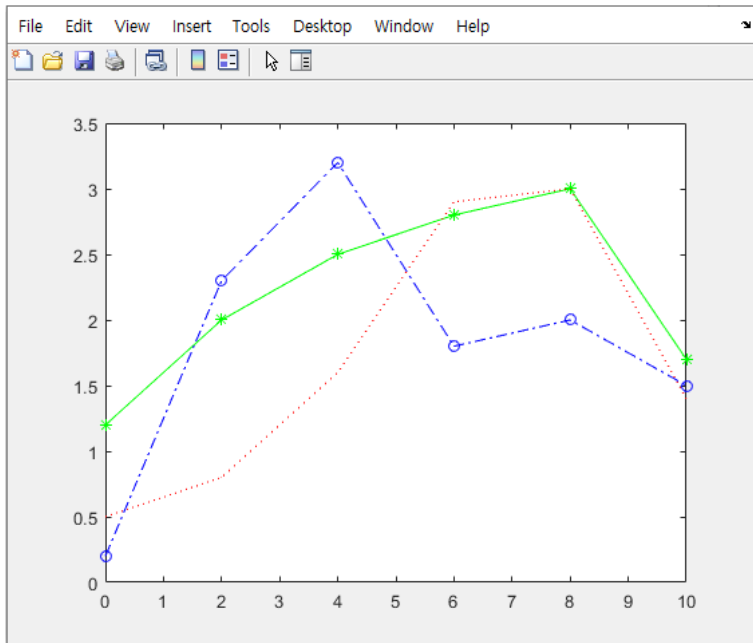
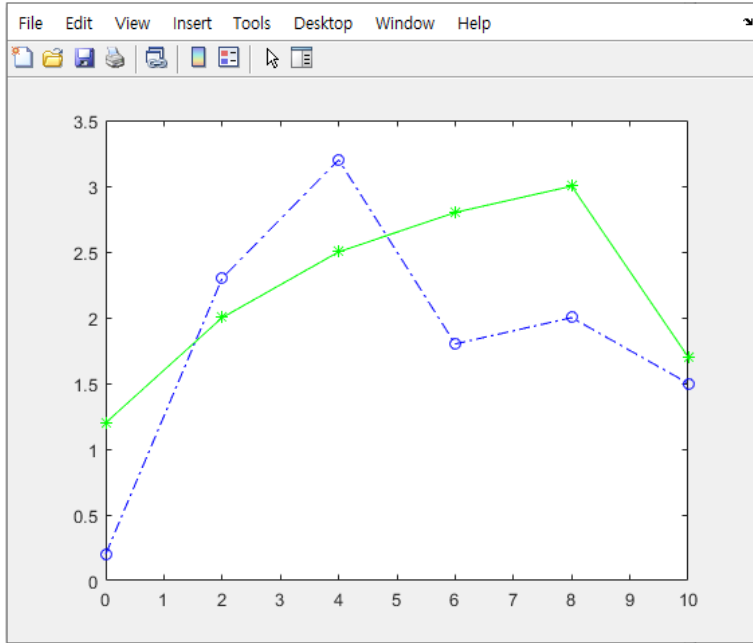
```
Command Window
>> x = 0:2:10;
>> y1 = [1.2,2,2.5,2.8,3,1.7];
>> y2 = [0.2,2.3,3.2,1.8,2,1.5];
>> y3 = [0.5,0.8,1.6,2.9,3,1.4];
>> plot(x,y1,'-+g',x,y2,'-.ob',x,y3,':r');
```



5.2

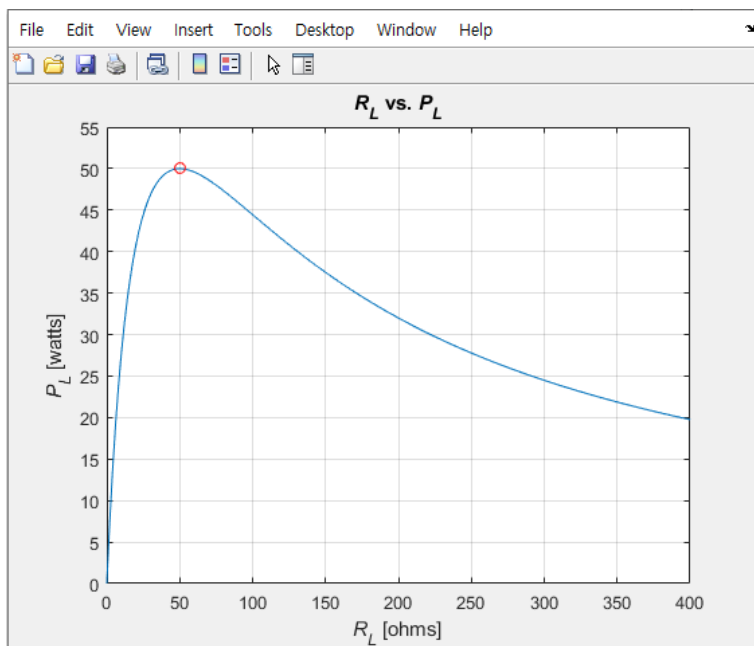
```
Command Window
>> x = 0:2:10;
>> y1 = [1.2,2,2.5,2.8,3,1.7];
>> y2 = [0.2,2.3,3.2,1.8,2,1.5];
>> y3 = [0.5,0.8,1.6,2.9,3,1.4];
>> plot(x,y1,'-+g');
>> hold on;
>> plot(x,y2,'-.ob');
>> plot(x,y3,':r');
```





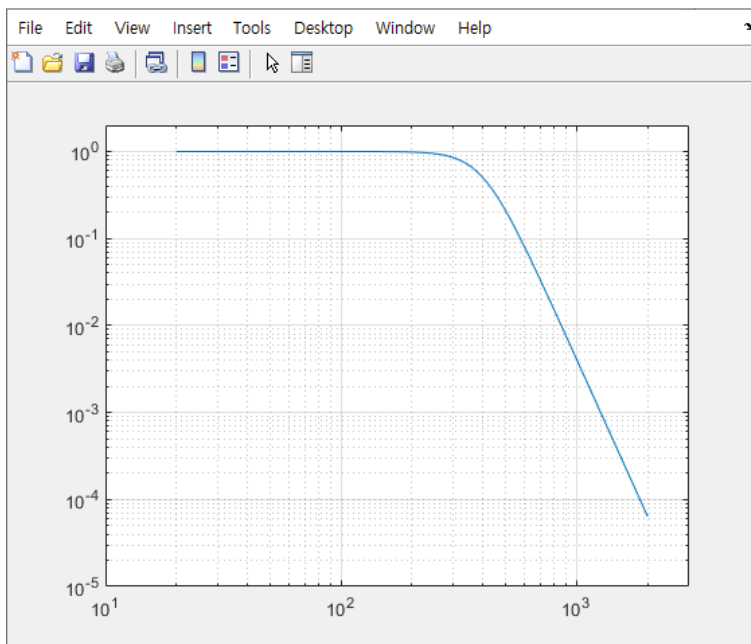
5.3

```
Command Window
>> V_Th = 100;
>> R_Th = 50;
>> R_L = 0:2:400;
>> P_L = V_Th^2*R_L./(R_L+R_Th).^2;
>> P_Lmax = V_Th^2/(4*R_Th);
>> plot(R_L,P_L,R_Th,P_Lmax,'ro');
>> axis([0 400 0 55]);
>> xlabel('{#itR_L} [ohms]');
>> ylabel('{#itP_L} [watts]');
>> title('{#itR_L} vs. {#itP_L}');
>> grid on;
```



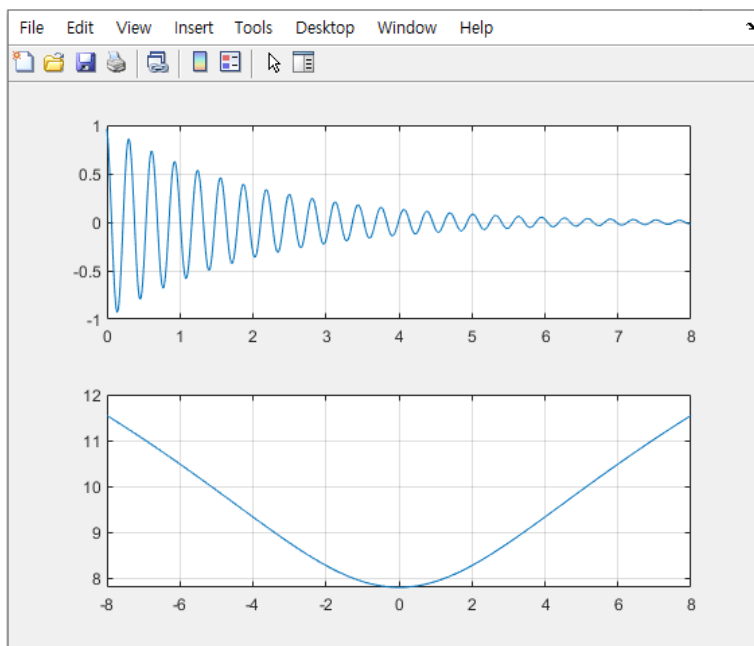
5.4

```
Command Window
>> f = linspace(20,2000,200);
>> fc = 400;
>> tf = 1./(1+(f/fc).^6);
>> loglog(f,tf);
>> axis([10^1 3*10^3 10^-5 2]);
>> grid on;
```



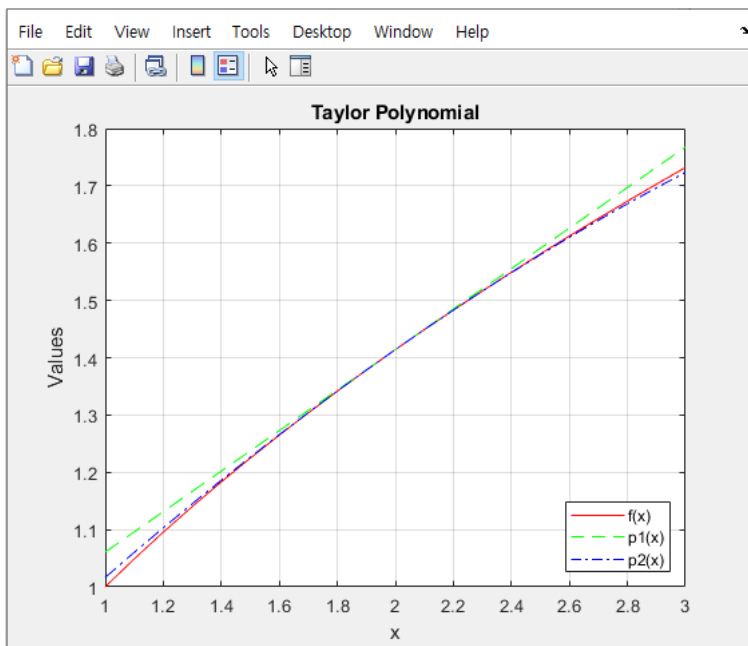
5.5

```
Command Window
>> u = 0:0.01:8;
>> y1 = exp(-0.5*u).*cos(20*u-6);
>> v = -8:0.01:8;
>> y2 = 6*log10(v.^2+20);
>> subplot(2,1,1);
>> plot(u,y1);
>> grid on;
>> subplot(2,1,2);
>> plot(v,y2);
>> grid on;
```



5.6

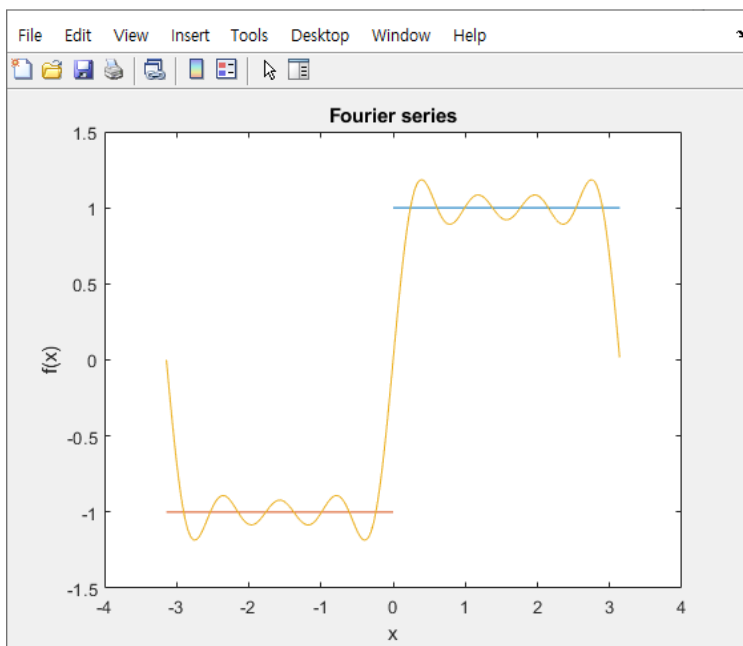
```
Command Window
>> x = 1.0:0.1:3.0;
>> fx = sqrt(x);
>> p1 = sqrt(2)+(sqrt(2)/4)*(x-2);
>> p2 = p1 - (sqrt(2)/32)*(x-2).^2;
>> plot(x,fx,'-r',x,p1,'--g',x,p2,'-b');
>> legend('f(x)','p1(x)','p2(x)','Location','SE');
>> grid on;
>> xlabel('x');
>> ylabel('Values');
>> title('Taylor Polynomial');
```



5.7

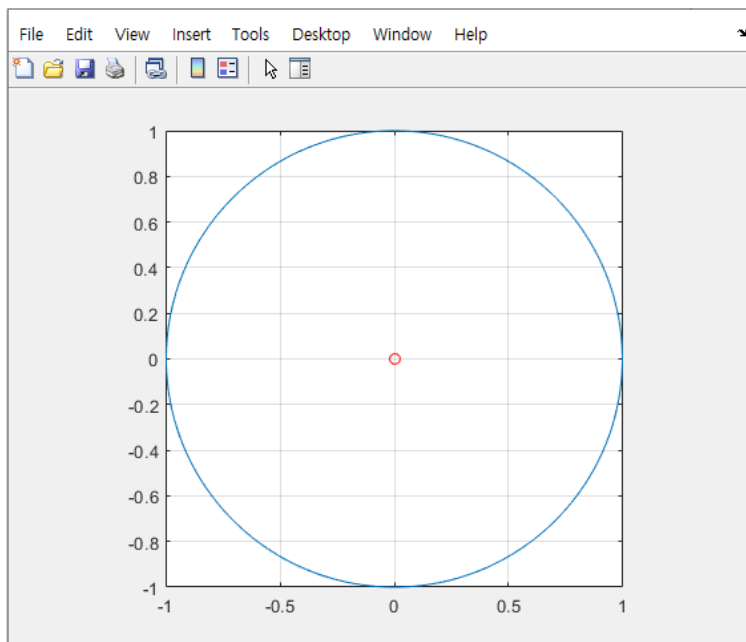
```
Command Window

>> x1 = [0,pi];
>> fx1 = [1,1];
>> x2 = [-pi,0];
>> fx2 = -[1,1];
>> x = [-pi:0.01:pi];
>> F = (4/pi)*(sin(x)+(1/3)*sin(3*x)+(1/5)*sin(5*x)+(1/7)*sin(7*x));
>> plot(x1,fx1,x2,fx2,x,F);
>> xlabel('x');
>> ylabel('f(x)');
>> title('Fourier series');
```



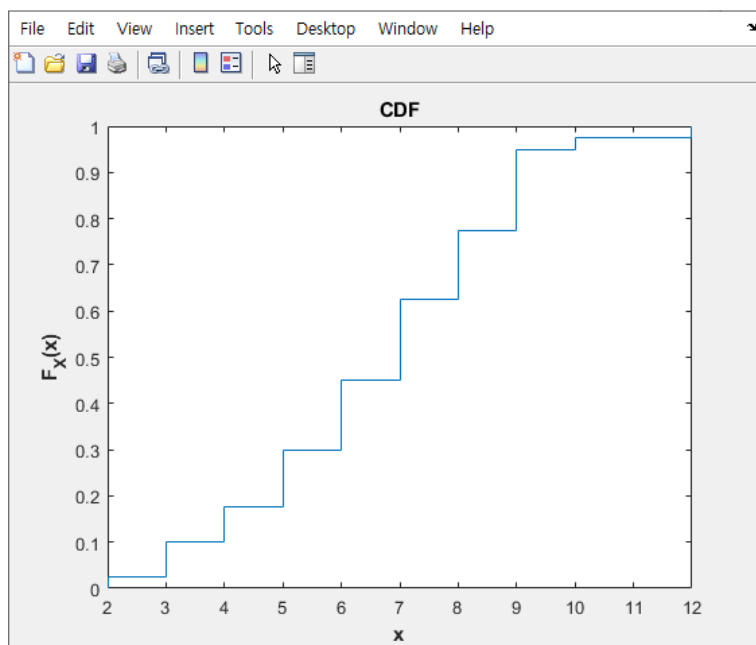
5.8

```
Command Window
>> theta = linspace(0,2*pi,361);
>> z = exp(i*theta);
>> plot(z);
>> axis equal;
>> axis square;
>> hold on;
>> plot(0,0,'ro');
>> grid on;
```



5.9

```
Command Window
>> n = 40;
>> x = sum(ceil(6*rand(2,n)));
>> stairs([min(x) sort(x)], [0:1/length(x):1]);
>> xlabel('x');
>> ylabel('F_X(x)');
>> title('CDF');
```

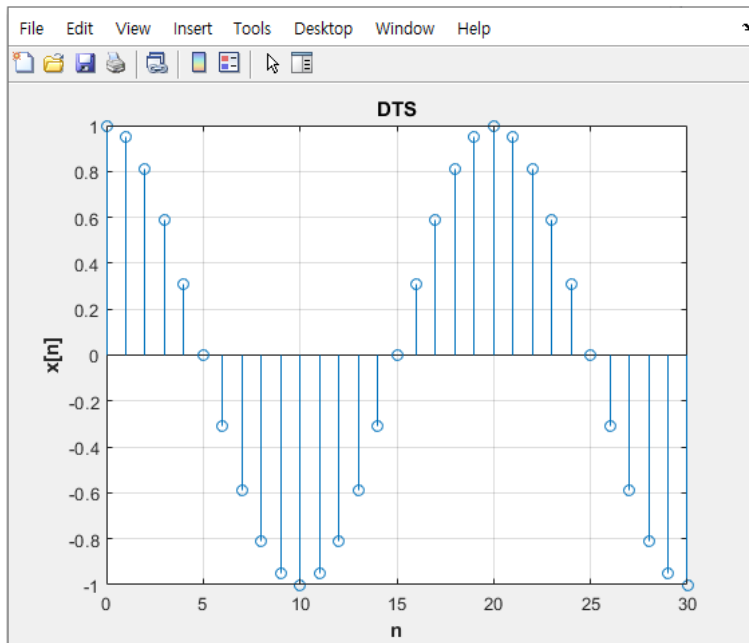


5.10

```

Command Window
>> N = 31;
>> A = 1;
>> omega = 0.3;
>> theta = pi/3;
>> n = 0:N-1;
>> x_n = A*cos(omega.*n*theta);
>> stem(n,x_n);
>> grid on;
>> xlabel('n');
>> ylabel('x[n]');
>> title('DTS');

```

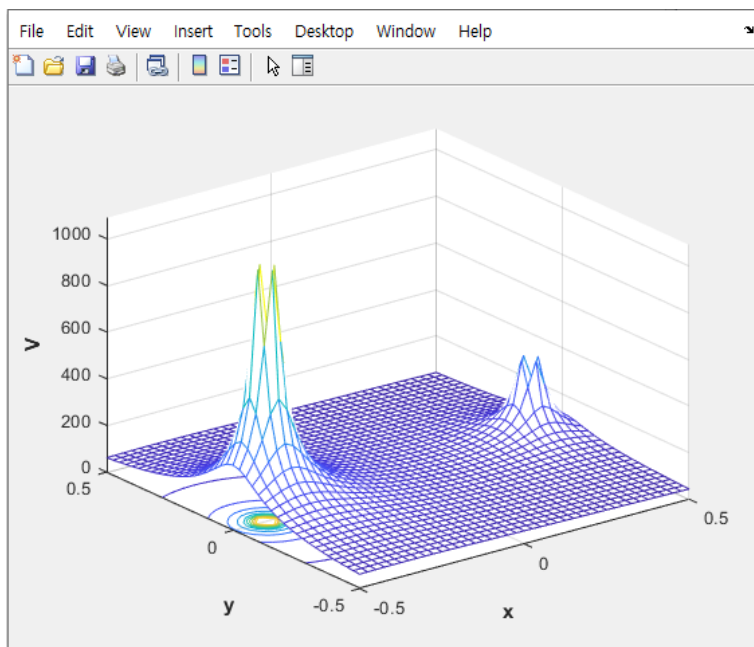


5.11

```

Command Window
>> eps0 = 8.854e-12;
>> q1 = 0.1*10e-9;
>> q2 = 0.3*10e-9;
>> [x,y] = meshgrid(-0.5:0.025:0.5);
>> r1 = sqrt((x - 0.4).^2 + y.^2);
>> r2 = sqrt((x + 0.4).^2 + y.^2);
>> V = 1/(4*pi*eps0)*(q1./r1 + q2./r2);
>> meshc(x,y,V);
>> xlabel('x');
>> ylabel('y');
>> zlabel('V');

```

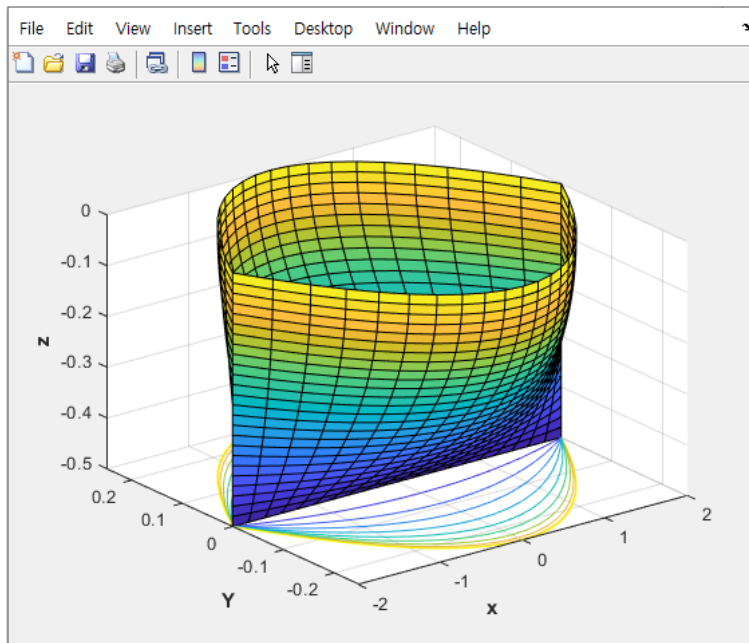


5.12

```

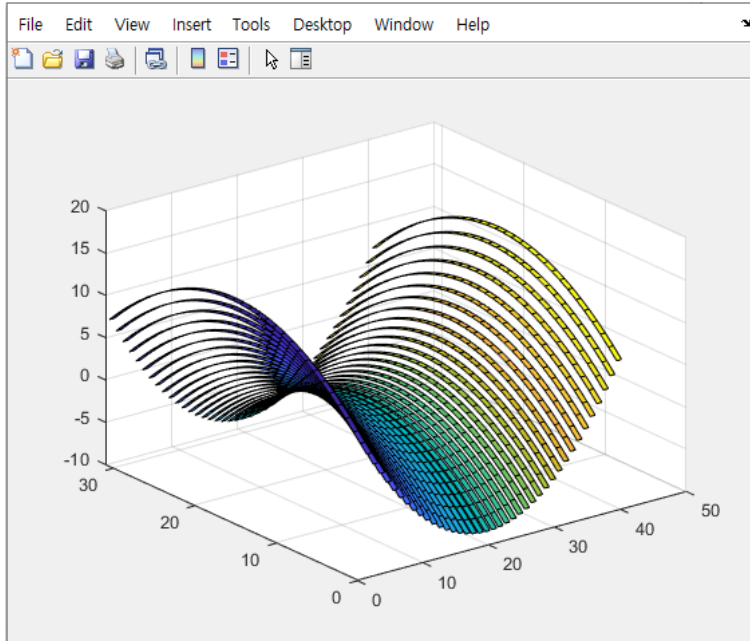
Command Window
>> L = 4;
>> B = 0.5;
>> D = 0.5;
>> x = -2:0.2:2;
>> z = -0.5:0.02:0;
>> [X,Z] = meshgrid(x,z);
>> V = B/2*(1-(2*X/L).^2).*(1-(Z/D).^2);
>> surf(X,V,Z);
>> hold on;
>> surf(X,-V,Z);
>> xlabel('x');
>> ylabel('V');
>> zlabel('z');

```



5.13

```
Command Window
>> x = -4:0.2:4;
>> y = -3:0.2:3;
>> [X,Y] = meshgrid(x,y);
>> Z = X.^2 - Y.^2;
>> ribbon(Z);
```



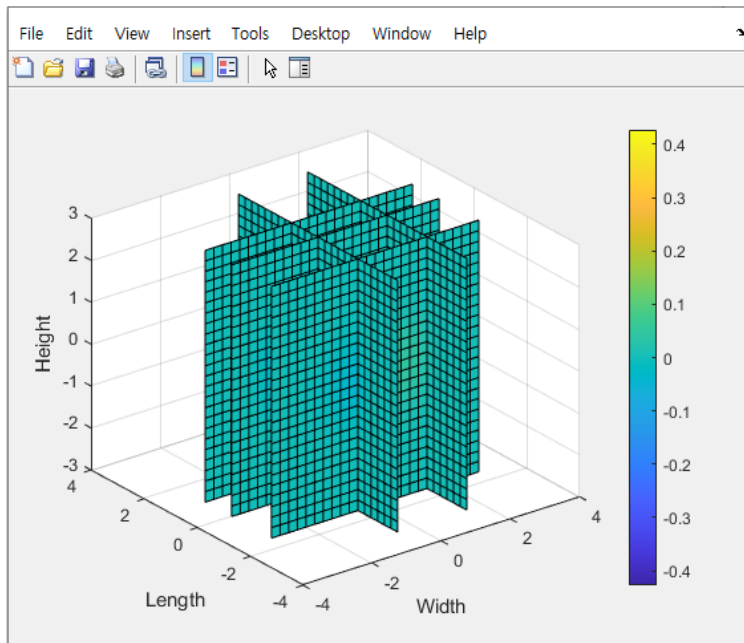
5.14

```

Command Window
>> [X,Y,Z] = meshgrid(-3:.25:3);
>> V = X.*exp(-X.^2-Y.^2-Z.^2);
>> slice(X,Y,Z,V,[-0.5,1.5],[-1.5,0,1.0],[]);
>> xlabel('Width');
>> ylabel('Length');
>> zlabel('Height');
>> colorbar;

```

체적의 너비(width)를 나타내는 x 축 -0.5 과 1.5 의 위치에서 직교하는 2개 절편 평면을 그리고 체적의 길이(length)를 나타내는 y 축 $-1.5, 0, 1.0$ 의 위치에서 직교하는 3개 절편 평면을 그릴 수 있다.



5.15

```
Command Window
>> x = [1 1 4 3;4 4 3 1;3 3 3 3];
>> y = [1 1 1 4;1 1 4 1;4 3 3 3];
>> z = [1 1 1 1;1 1 1 1;1 4 4 4];
>> patch(x,y,z, 'blue');
>> view(3);
>> grid on;
>> box on;
```