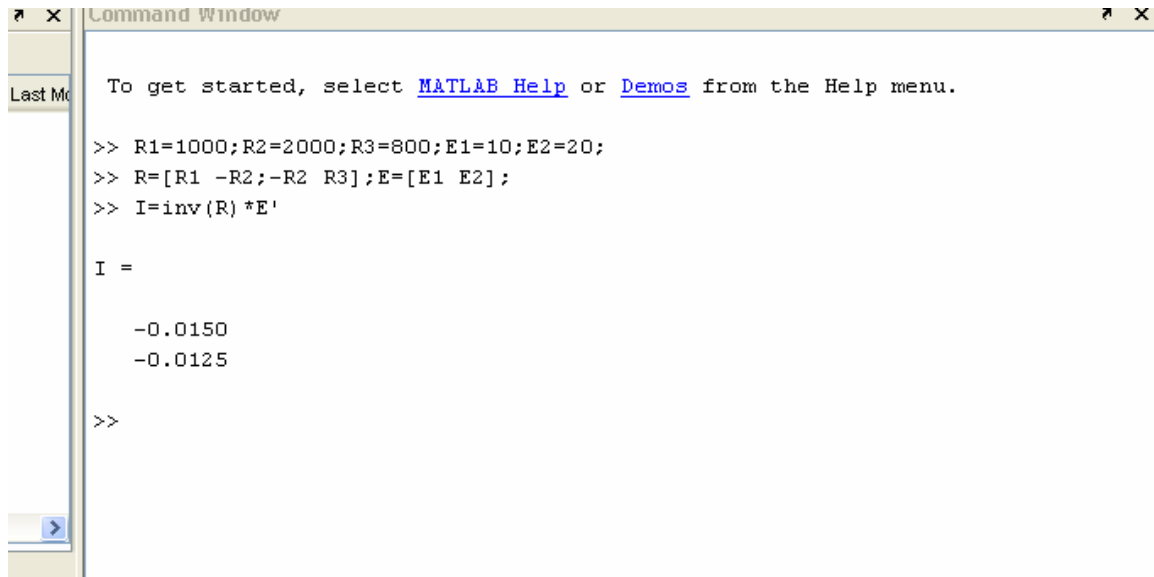# Matlab Tutorial

Example 1. Inverting Systems of Equations.

```
Command Window
                                                              ↗ ✕

  To get started, select MATLAB Help or Demos from the Help menu.

>> R1=1000;R2=2000;R3=800;E1=10;E2=20;
>> R=[R1 -R2;-R2 R3];E=[E1 E2];
>> I=inv(R)*E'

I =

   -0.0150
   -0.0125

>>
```

The single quote after the E transposes the matrix so that matrices match for multiplication and the vector I has the correct dimensions.

The verbiage "To get started…" is from the Matlab Command Window and should not be typed unless one wants Help or Demos.

Example 2. Two Dimensional Plots

```
 To get started, select MATLAB Help or Demos from the Help menu.

>> t=linspace(0,0.003,1000);E=10;C=0.1E-6;R1=1E4;R2=2E4;R3=5E3;
>> TAU1=R1*C;TAU2=R2*C;TAU3=R3*C;
>> V1=E*(1-exp(-t/TAU1));V2=E*(1-exp(-t/TAU2));V3=E*(1-exp(-t/TAU3));
>> plot(t,V1,t,V2,t,V3);
>> title('Step Function Response');
>> ylabel('Capacitor Voltage');
>> xlabel('Time');
>>
```
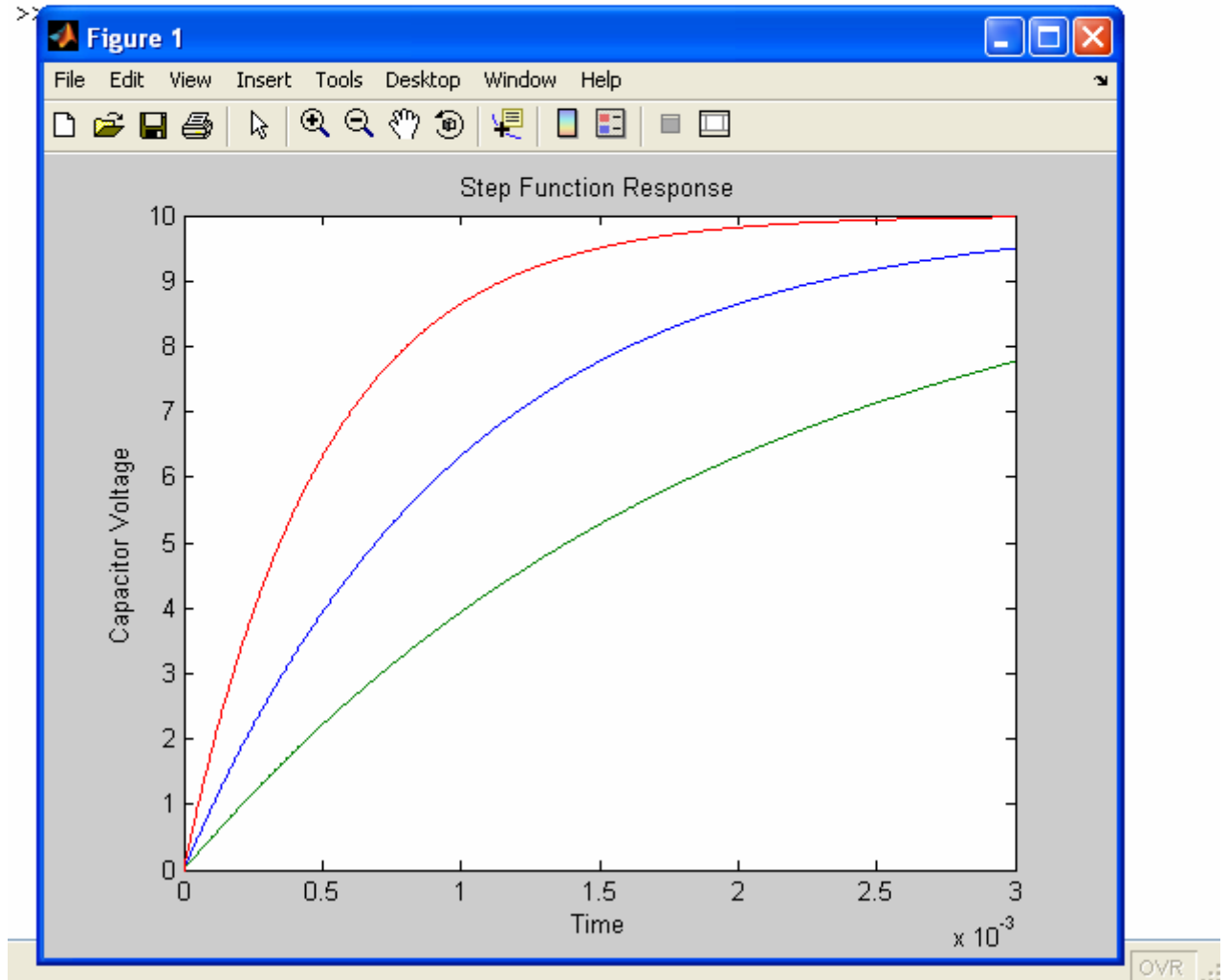
Example 3. Bode Plots. Although the Bode plots can be made with the same straightforward method used with Mathcad, the Matlab function "bode" will be used instead. It's arguments are the numerator and denominator of the transfer function express as a power of s with the coefficients listed from highest to lowest. The horizontal axis is plotted as a function of the angular frequency ω rather than the frequency in Hertz. To convert to Hertz:

- Hint 1: Tea for
- Hint 2: Apple

Command Window
```
>> f3=1000;tau=1/(2*pi*f3);K=1;N=[K*tau 0];D=[tau 1];bode(N,D);
>>
```
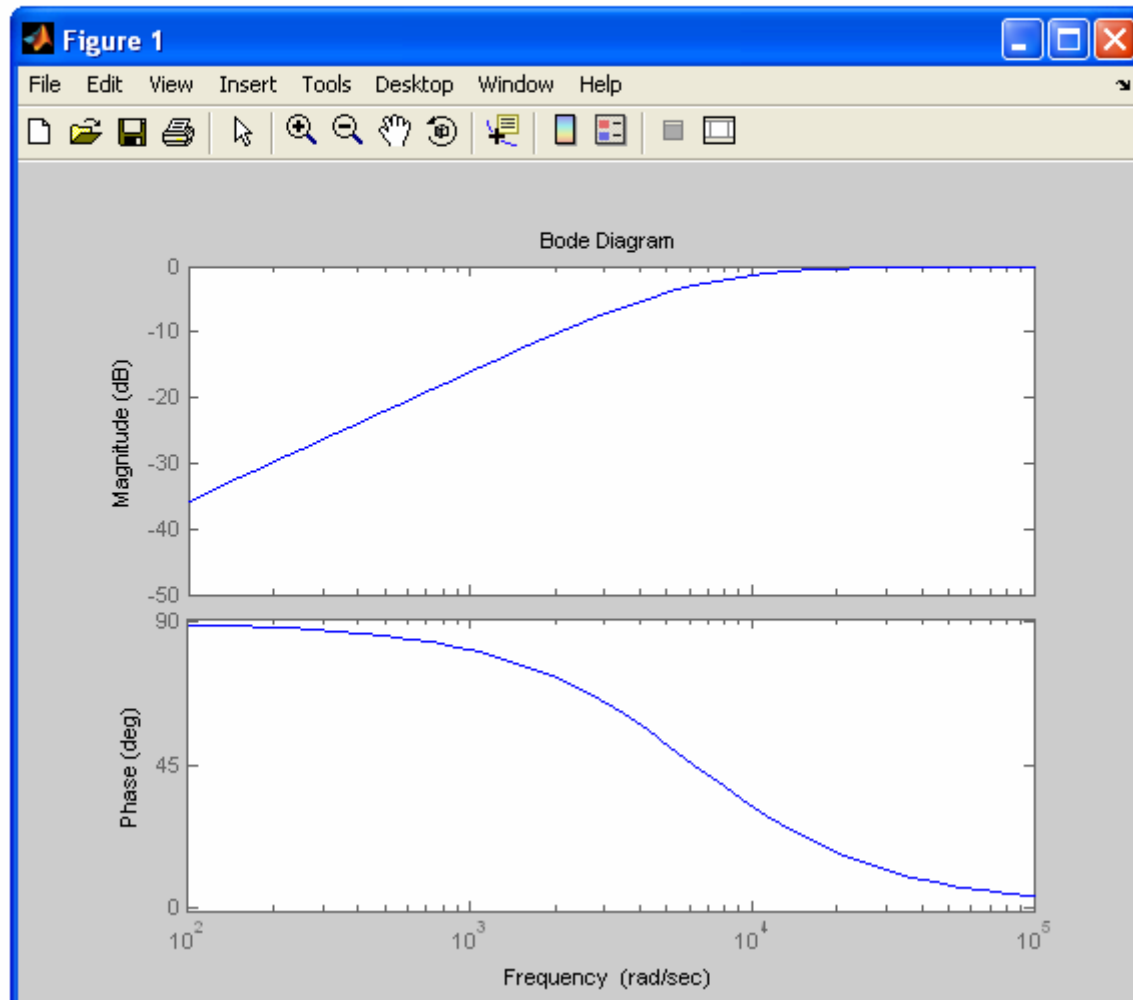

Type "help bode" in the Matlab command window for the full list of parameters.