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Electrical engineering

17/ENG04/037

Assignment 3

```
commandwindow
clear
clc
syms t
v(t)=110*cos(120*pi*t)
c=100*10^-6
q=c*v
t=0:0.01:0.35
a=subs(q,t)
b=subs(v,t)
i=diff(q)
c=subs(i,t)
p=i*v
d=subs(p,t)
dn=double(d)
plot(t,b,'blue')
hold on
plot(t,a,'red')
hold on
plot(t,dn,'black')
grid on
grid minor
ylabel('Variables')
xlabel('Time(sec)')
legend('Voltage(V)','Current(A)','Power(W)')
```

Command Window v(t) = 110*cos(120*pi*t)

c =

1.0000e-04

q(t) = (11*cos(120*pi*t))/1000

t =

Columns 1 through 12

0 0.0100 0.0200 0.0300 0.0400 0.0500 0.0600 0.0700 0.0800 0.0900 0.1000
0.1100

Columns 13 through 24

0.1200 0.1300 0.1400 0.1500 0.1600 0.1700 0.1800 0.1900 0.2000 0.2100 0.2200
0.2300

Columns 25 through 36

0.2400 0.2500 0.2600 0.2700 0.2800 0.2900 0.3000 0.3100 0.3200 0.3300 0.3400
0.3500

a(t) = [11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 -
11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 -

11/4000, (11*5^(1/2))/4000 - 11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000, - (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, (11*5^(1/2))/4000 - 11/4000, - (11*5^(1/2))/4000 - 11/4000, 11/1000]   b(t) =   [110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110, - (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, (55*5^(1/2))/2 - 55/2, - (55*5^(1/2))/2 - 55/2, 110]

i(t) =   -(33*pi*sin(120*pi*t))/25   c(t) =   [0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, -(33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, -(33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, -(33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, - (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, -(33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0, (33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, -(33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, (33*pi*2^(1/2)*(5^(1/2) + 5)^(1/2))/100, -(33*2^(1/2)*pi*(5 - 5^(1/2))^(1/2))/100, 0]   p(t) =   - (726*pi*cos(120*pi*t)*sin(120*pi*t))/5   d(t) =   [0, -(363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, -(363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0, -(363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, - (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0, -(363*2^(1/2)*pi*(5^(1/2)/4 +

1/4)*(5 - 5^(1/2))^(1/2))/10, -(363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0, -(363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, - (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0, -(363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, -(363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0, -(363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, -

(363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0, -(363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, -(363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 - 1/4)*(5^(1/2) + 5)^(1/2))/10, (363*2^(1/2)*pi*(5^(1/2)/4 + 1/4)*(5 - 5^(1/2))^(1/2))/10, 0]

dn =

Columns 1 through 12

0 -216.9166 -134.0618 134.0618 216.9166 0 216.9166 -134.0618 134.0618 216.9166 0 -216.9166

Columns 13 through 24

-134.0618 134.0618 216.9166 0 -216.9166 -134.0618 134.0618 216.9166 0 -216.9166 -134.0618 134.0618

Columns 25 through 36

216.9166 0 -216.9166 -134.0618 134.0618 216.9166 0 -216.9166 -134.0618 134.0618 216.9166 0

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Assignment 4

1. commandwindow

2. clear

3. clc

4. a=[1,-2,-1,3;2,3,0,1;1,0,-4,-2;0,-1,3,1]

5. eig(a)

They are not stable systems are only stable if there is no positive value in its eigenvalues

Command window

```
a =

     1    -2    -1     3
     2     3     0     1
     1     0    -4    -2
     0    -1     3     1


ans =

   2.4323 + 2.2437i
   2.4323 - 2.2437i
  -1.9323 + 1.7651i
  -1.9323 - 1.7651i
```