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Department: ELECTRICAL ENGINEERING

Matric No: 17/ENG04/015

To solve V(t)=110cos(120πt)

commandwindow

clear

clc

close all

syms t

V=110\*cos(120\*pi\*t)

C=100\*10^-6;

Q=C\*V;

t=0:0.01:0.35;

Vn=subs(V,t);

Vnn=double(Vn)

I=diff(Q);

In=subs(I,t);

P=I\*V;

Pn=subs(P,t);

Pnn=double(Pn);

plot(t,Vnn,'blue');

hold on;

plot(t,In,'red');

hold on

plot(t,Pnn,'black');

xlabel('Time(secs)');

ylabel('Variable');

legend('Voltage(V)','Current(A)','Power(W)')

axis tight

grid on

grid minor

OUTPUT

V =

110\*cos(120\*pi\*t)

C =

 1.0000e-04

Q =

(11\*cos(120\*pi\*t))/1000

t =

 Columns 1 through 3

 0 0.0100 0.0200

 Columns 4 through 6

 0.0300 0.0400 0.0500

 Columns 7 through 9

 0.0600 0.0700 0.0800

 Columns 10 through 12

 0.0900 0.1000 0.1100

 Columns 13 through 15

 0.1200 0.1300 0.1400

 Columns 16 through 18

 0.1500 0.1600 0.1700

 Columns 19 through 21

 0.1800 0.1900 0.2000

 Columns 22 through 24

 0.2100 0.2200 0.2300

 Columns 25 through 27

 0.2400 0.2500 0.2600

 Columns 28 through 30

 0.2700 0.2800 0.2900

 Columns 31 through 33

 0.3000 0.3100 0.3200

 Columns 34 through 36

 0.3300 0.3400 0.3500

Vn =

[ 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]

Vnn =

 Columns 1 through 3

 110.0000 -88.9919 33.9919

 Columns 4 through 6

 33.9919 -88.9919 110.0000

 Columns 7 through 9

 -88.9919 33.9919 33.9919

 Columns 10 through 12

 -88.9919 110.0000 -88.9919

 Columns 13 through 15

 33.9919 33.9919 -88.9919

 Columns 16 through 18

 110.0000 -88.9919 33.9919

 Columns 19 through 21

 33.9919 -88.9919 110.0000

 Columns 22 through 24

 -88.9919 33.9919 33.9919

 Columns 25 through 27

 -88.9919 110.0000 -88.9919

 Columns 28 through 30

 33.9919 33.9919 -88.9919

 Columns 31 through 33

 110.0000 -88.9919 33.9919

 Columns 34 through 36

 33.9919 -88.9919 110.0000

I =

-(33\*pi\*sin(120\*pi\*t))/25

In =

[ 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 =

-(726\*pi\*cos(120\*pi\*t)\*sin(120\*pi\*t))/5

Pn =

[ 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]

Pnn =

 Columns 1 through 3

 0 -216.9166 -134.0618

 Columns 4 through 6

 134.0618 216.9166 0

 Columns 7 through 9

 -216.9166 -134.0618 134.0618

 Columns 10 through 12

 216.9166 0 -216.9166

 Columns 13 through 15

 -134.0618 134.0618 216.9166

 Columns 16 through 18

 0 -216.9166 -134.0618

 Columns 19 through 21

 134.0618 216.9166 0

 Columns 22 through 24

 -216.9166 -134.0618 134.0618

 Columns 25 through 27

 216.9166 0 -216.9166

 Columns 28 through 30

 -134.0618 134.0618 216.9166

 Columns 31 through 33

 0 -216.9166 -134.0618

 Columns 34 through 36

 134.0618 216.9166 0

GRAPH

