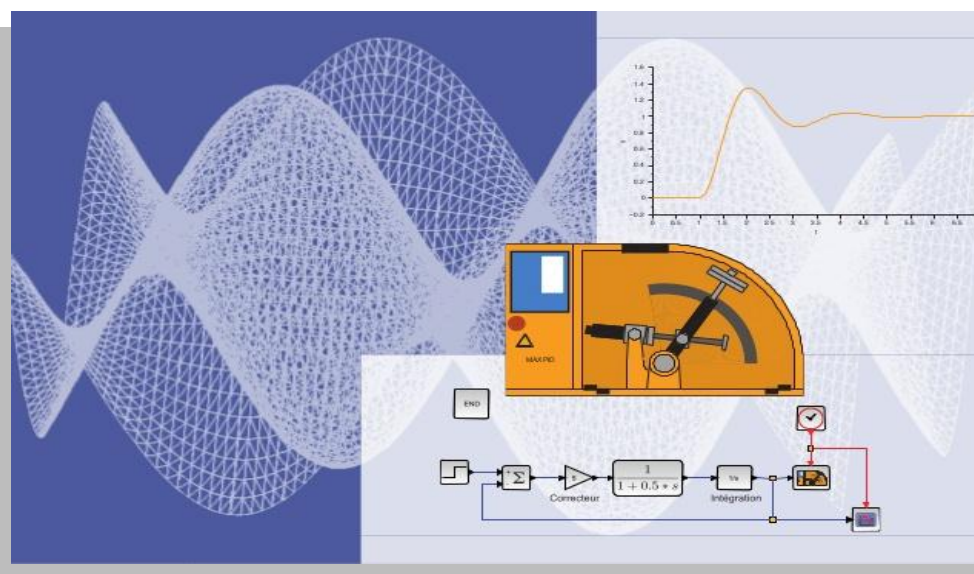


## Circuit elements using Scilab



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## Resistance:

A resistor is a two-port electrical component that resists an electric current (I) by producing a voltage drop (V) between its terminals according to the Ohm's law.

$$V=I \cdot R$$

### Scilab code

```
printf ("Given ")
disp (" Resistance used is 4 ohm")
disp (" Current flow I = 2.5 * Sin(w*t)")
disp ("Angular frequency(w)=500 rad / s ")
R = 4;
iamp =2.5; w =500;
t =0:0.001:0.012566 //t initialization
i =2.5* sin (w*t)
Vamp = iamp *R; //V=IR Ohms law
printf ("v=%d*sin(%d * t ) (V) ",Vamp ,w)
pamp = iamp * iamp *R;
//P=I^2R
printf ("p=%d( sin(%d*t ))^2 (W)/n" ,pamp ,w)
p= pamp * sin (w*t)^2;
W =25*( t/2- sin (2*w*t) /(4* w))
function p=f(t)
    p= pamp * sin (w*t)^2
endfunction
w1= intg (0,2*%pi/w,f);
```



subplot (221) //divide a graphics window into a matrix of sub-windows

```
plot (t,i)
```

```
xtitle ( 'i vs wt' , 'wt' , 'i' );
```

subplot (222)

```
plot (t,p)
```

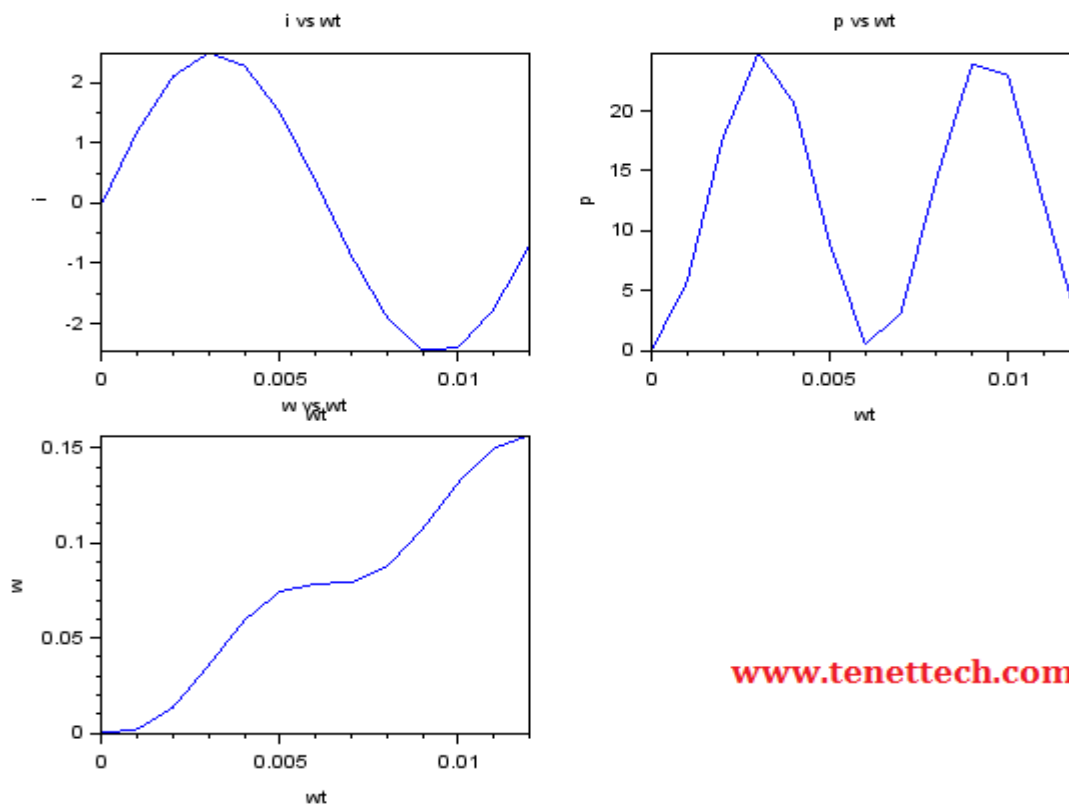
```
xtitle ( ' p vs wt' , 'wt' , 'p' );
```

subplot (223)

```
plot (t,W)
```

```
xtitle ( 'w vs wt' , 'wt' , 'w' );
```

### Output:



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## Inductance:

Inductor is an electrical component that can store energy in electrical circuits. The relationship between the voltage across the ports of an inductor of inductance and the current passing through it is given by:

$$V=L \, di/dt$$

Inductors can also be used to differentiate between high-frequency and low-frequency signals and this makes them useful in electronic filters. An inductor shows a high impedance for high frequency signals.

### Scilab code:

```
clc

printf ("Given ")

disp (" Inductance used is 30mH")

disp (" Current flow is i =10*sin(50*t)")

L =30*10^ -3;

iamp =10;

t =0:0.01:0.06283;                               //t Initialisation

i =10* sin(50*t)

vamp =L* iamp *50;

v= vamp*cos(50*t)

pamp=vamp*iamp/2;

p=pamp*sin(100*t)

wL =0.75*(1-cos (100*t));

subplot(221)

plot(t,i)

xtitle('i vs wt','wt','i');
```

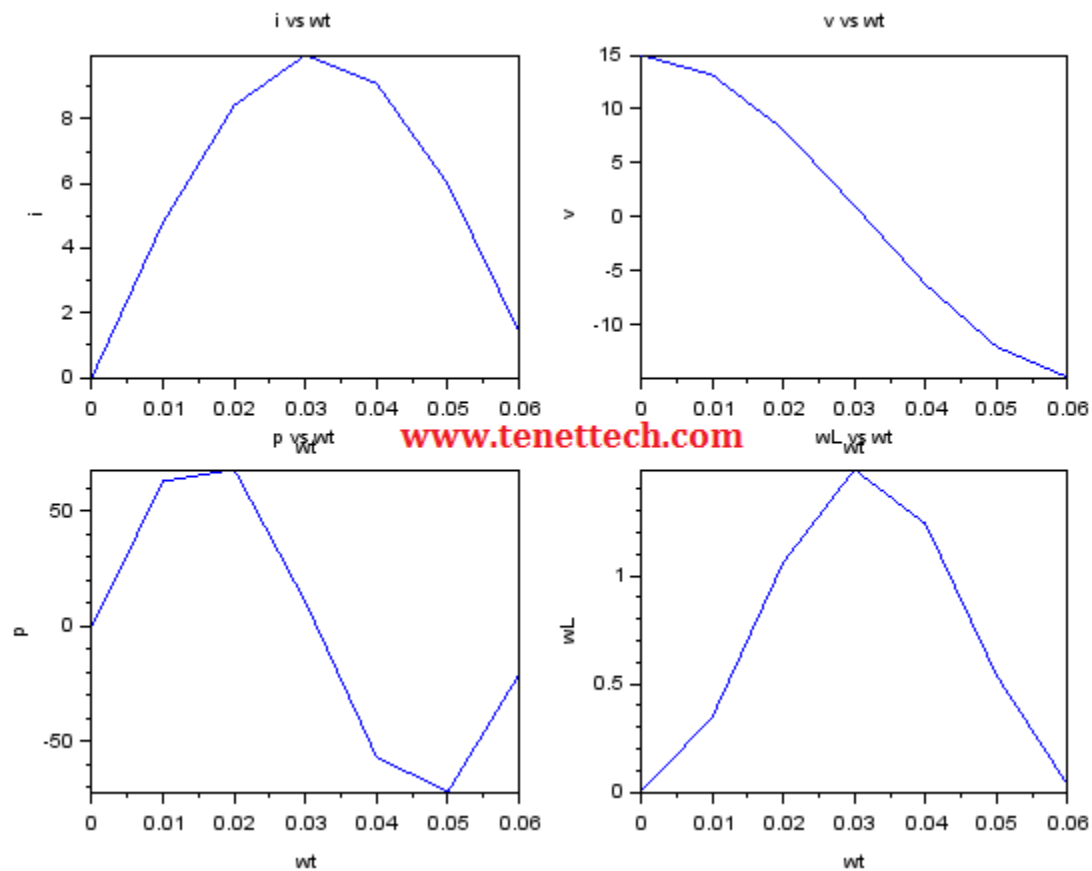


```
subplot(222)
    plot (t,v)
    xtitle('v vs wt','wt','v');

subplot(223)
    plot(t,p)
    xtitle('p vs wt','wt','p');

subplot(224)
    plot(t,wL)
    xtitle('wL vs wt','wt','wL');
```

### Output:



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## Capacitance:

A capacitor is an electrical component that can store energy in electrical circuits. The relationship between the voltage across a capacitor with capacitance and the current passing through it is given by the:

$$i = C \, dv/dt$$

Capacitors can also be used to differentiate between high-frequency and low-frequency signals and this makes them useful in electronic filters. A capacitor has a high impedance when a signal is low frequency signals.

### Scilab code:

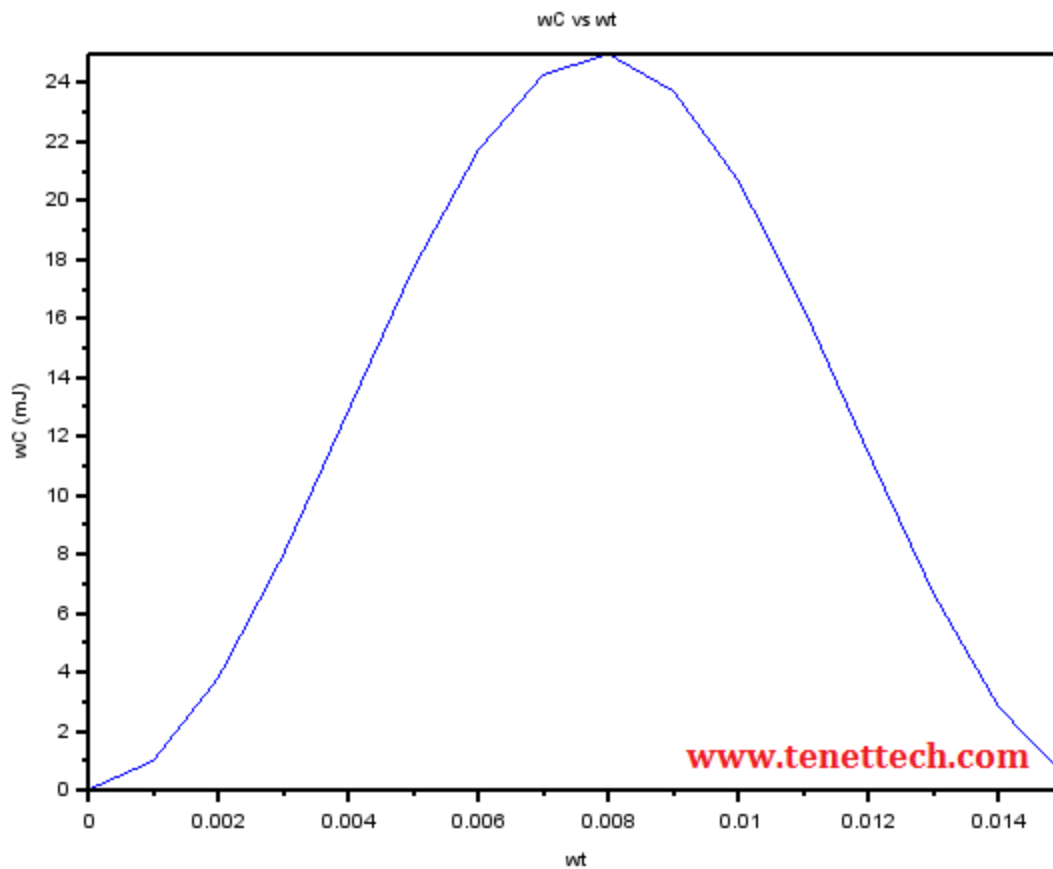
```
printf ("Given ")
disp (" Capacitance used is 20uF")
disp (" Voltage is v=50*sin(200*t)")
C =20*10^-6;
                                     // Given tha t v=50* sin(200*t);
vamp=50;
t =0:0.001:0.015;                 //t initialisation
                                     //q=C*v
qamp=vamp*C
q=qamp*sin(200*t)
                                     //i=C*d/dt (v)
                                     //d/dt( sin 200t )=200 *cos t
iamp =C* vamp *200;
i=iamp*cos(200*t)
                                     //sinA*cosB=( sin(A+B)+sin(A-B))/2
```

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```
pamp = vamp*iamp/2;  
p= pamp * sin (400* t)  
  
//On integrating 'p' w.r.t t"  
  
wC =12.5*(1-cos(400*t));  
  
figure  
a=gca();  
plot(t,wC)  
xtitle('wC vs wt ', 'wt ', 'wC (mJ) ');  
a.thickness = 2;
```

### Output





For more information please visit: [www.tenettech.com](http://www.tenettech.com)

For technical query please send an e-mail: [info@tenettech.com](mailto:info@tenettech.com)

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