# Contents

```
% https://la.mathworks.com/help/symbolic/solve-a-system-of-differential-equations.html
clc;
clear;

syms t vc(t) il(t) C1 C2;

%Valores de los componentes
L=1;
C=1;

%Condiciones Iniciales
v0=1;
i0=0;

%Valores de tiempo y paso
ti=0;
tf=100;
h=0.01;

%Matrices del circuito
%Lleva la forma de:
%M*(dx/dt)+N*x=u(t);

M=[-C 0;0 -L];
N=[0 1;-1 0];
u=[0;0];

%Condiciones iniciales
Xant=[v0;i0];


%Se lleva a la forma
% dx/dt=q(t)-P*x

P=-1.*(M\N)


x=[vc;il];
odes = diff(x) == P*x
constantes = x(0) == Xant;
[vSol(t), iSol(t)] = dsolve(odes,constantes);
vSol(t) = simplify(vSol(t))
iSol(t) = simplify(iSol(t))
```

```
P =

    0    1
   -1    0


odes(t) =

  diff(vc(t), t) == il(t)
 diff(il(t), t) == -vc(t)


vSol(t) =

-sin(t)


iSol(t) =

cos(t)
```
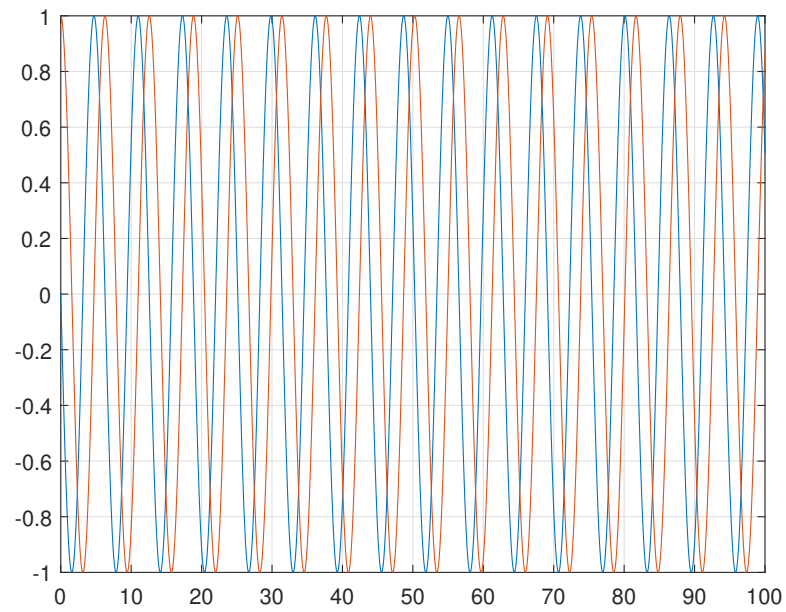
## Graficas

```
clf
fplot(vSol,[ti,tf])
hold on
fplot(iSol,[ti,tf])
grid on
```

```
t=ti:h:tf;
v1=eval(subs(vSol));
i1=eval(subs(iSol));

%[T, lambda] = eig(P);
%syms t;
%elambda=diag(exp(eig(P).*t))
%H=T*elambda*inv(T)
%v=H*Xant;
```