Problem 4-11

PROB4_11.M

```
% Listing in Fig 4-11b
clc,clg,clear
% Input Data
L=5e-6; C=100e-6; rL=1e-3; R=1.0; fs=100e3; Vcontrol=0.75;
Ts=1/fs; tmax=2*Ts; deltat=Ts/50;
%
time =0:deltat:tmax;
A=[-rL/L -1/L; 1/C -1/(C*R)];
MN=inv(eye(2) - deltat/2 * A);
M=MN*(eye(2)+deltat/2 * A);
%
iL(1)=4.0; vC(1)=5.5;
vL(1)= -rL*iL(1) - vC(1);
timelength=length(time);
%
for k = 2:timelength
  if iL(k-1) > 0
      x=M*[iL(k-1) vC(k-1)]';
      iL(k)=x(1); vC(k)=x(2);
      vL(k)= -rL*iL(k) - vC(k);
  else
      iL(k)=0;
      vC(k)=(vC(k-1)-1/(C*R)*deltat/2*vC(k-1))/(1+deltat/(2*C*R));
      vL(k)=0;
  end
end
%
plot(time,vL)
```