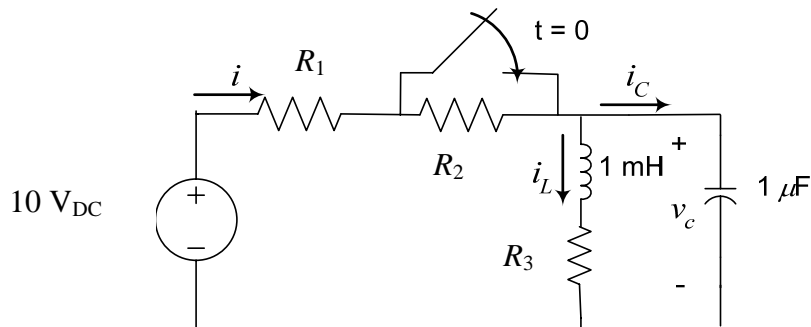


**King Fahd University of Petroleum & Minerals**  
**Department of Electrical Engineering**  
 EE205 Electrical Circuits II-082  
**Project: Computer-Aided Circuit Analysis**

**Due: In class (Saturday 30, Sunday 31) May, 2009**

- Write down the matrix state equation for the following circuit after the switch is closed at time  $t = 0$ .
- Develop a MATLAB program to solve these equations numerically using Euler's method.
  - Discuss your choice of the time increment  $\Delta t$ . Support your argument with different plots of  $v_C$  with different values of  $\Delta t$ .
  - What is the type of response (over, under, or critical damped)? Justify analytically the type of response.
  - Plot the currents  $i_L$ ,  $i_C$ , and  $i$  in one Figure. Does your result support the KCL relation between the three variables?
  - In the previous figure justify the choice of the stop time.
    - How long does it take  $i_L$  to reach 90% of its final value.
    - Is 0 to 0.6 msec enough for your case ?!



$S_1$  &  $S_2$  are your serial numbers as assigned by the class instructor

$R_1 =$  section number.

$R_2 = S_2 + S_1 \quad \Omega$

$R_3 = |S_2 - S_1| \quad \Omega$

Instructions:

1. Your report should be self contained.
2. Writing style and organization are very important (Quality not Quantity!). You should not just answer the question but rather discuss all findings.
3. **Your serial numbers should be clearly presented on the first page.**
4. A group of two students work together and submit one report.
5. To discourage blind copying, you will be discussed by your instructor in the details of your report.
6. Include all the calculations and the complete program to do the numerical analysis. (your names should appear on the printed program as a comment)
7. Use MATLAB commands, **axis**, **ylabel**, **xlabel**, **title**, help, lookfor .... To produce neat figures.
8. Here are some nice excuses ☺ for not doing well: *I do not know how to use MATLAB.... This is the first time ..... The printer is not working...I had major exams ... etc*