King Fahd University of Petroleum & Minerals
Department of Electrical Engineering
EE205 Electrical Circuits II-092
Project: Computer-Aided Circuit Analysis
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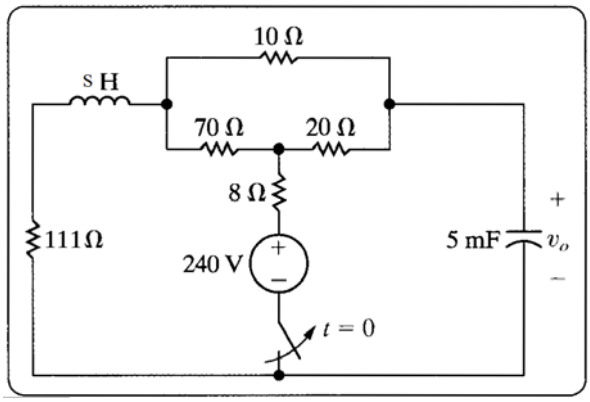
Due: In class (Tuesday, May 18, 2010)

1. The switch in the circuit shown has been closed for long time. The switch opens at t=0. Find the initial conditions for the circuit.
2. Find $v_o(t)$ for t >0.
3. Write down the matrix state equation for the circuit after the switch is open at time t = 0.
4. Develop your own MATLAB code to solve these equations numerically using Euler's method.
   a) **Step time:** Discuss **your** choice of the time increment Δt. Support your argument with different plots of v_o with different values of Δt.
   b) **Stop time:** In the previous figure justify the choice of the stop time.
      i. How long does it take v_o to reach its final value. (10%, 1%)
      ii. Is 0 to 1 *m*sec enough for your case ?!

   c) Plot the analytical solution with the numerical solution on the same plot. What is the type of response (over, under, or critical damped)? Justify analytically the type of response.



Where S is *your serial numbers as assigned by the class instructor. If your serial number is 5, then the inductor value becomes 5 H.*

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. To discourage blind copying, you may be discussed by your instructor in the details of your report.
5. Include all the calculations and the complete program to do the numerical analysis. (your names should appear on the printed program as a comment)
6. Use MATLAB commands, **axis**, **ylabel**, **xlabel**, **title**, help, lookfor …. To produce neat figures.
7. 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*

Good luck, Dr. Ali Muqaibel