VE311 Electronic Circuits

Homework 07

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The course homework is intended for the students to learn and to think rather that just copy and paste. This is why, me and my TAs team are confident that you're going to learn.

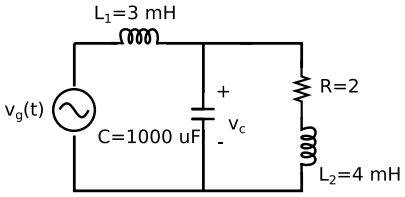
- Poles and Zeros
  1. Solve the follow set of equations find if the system is stable or inestable. What is the frequency at -3dB Use the plots of Bode and Nyquist and support your response. Mathematical development is required, magic does not exist.

$$F_L(s) = \frac{s(s+10)}{(s+100)(s+25)}$$

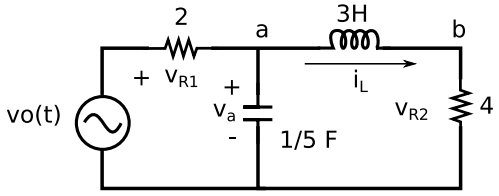
$$FH(s) = \frac{1-\frac{s}{10^5}}{(1+\frac{s}{10000})(1+\frac{s}{40000})}$$

  2. Solve the follow circuits and interpret the result if those are stable o inestable through Bode and Nyquist diagrams. Magic only exist in Hogwarts... and even there you've to study...

     In the follow circuit, the output voltage is referred to the inductor for a $v_g(t) = 10\sin(277t)$



     For the follow circuit, the output voltage is analyzed at resistor $R_2 = 4\Omega$. The applied voltage is $v_0(t) = \frac{\pi t}{2}$. And yes, this is a variable source. So enjoy!!!.



3. For the next circuit, derive the expressions for V_1/V_i, V_2/V_1, V_0/V_i. Calculate the poles and zeros, obtain the bode diagram and compare it with a simulation in Spice, explain..., *if* (**PLEASE: PAY ATTENTION HERE!!!!!!**) R= 10 kΩ, C1= 20 μF, R_1= 10 kΩ, C2= 4.7 mF and R_f= 100 kΩ $V_i = 100\cos(600t)$