ECET341 Homework 6

(1) Find the cutoff frequency ω_C for the RL filter shown in Fig.1. If $v_i = 10\cos\omega t$ (V), write the steady state expression for v_0 when $\omega = \omega_C$ and $\omega = 3\omega_C$.
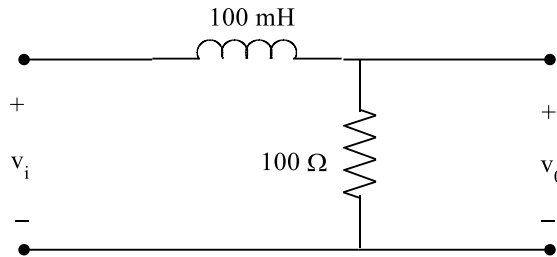
100 mH

+

v_i

100 Ω

+

v_0

−

−

Fig.1.

(2) Use a 20 mH inductor to design a low-pass RL filter with a cutoff frequency of 500/π Hz.

   (a) Specify the value of the resistor.
   (b) A load having a resistance of 20 Ω is connected across the output terminals of the filter. What is the cutoff frequency of the loaded filter in hertz?

(3) Find the frequency response H(jω) and cutoff frequency ω_C of the low-pass filter shown in Fig.2. If $v_i = 100\cos\omega t$ (V), write the steady state expression for v_0 when $\omega = \omega_C$ and $\omega = 5\omega_C$.
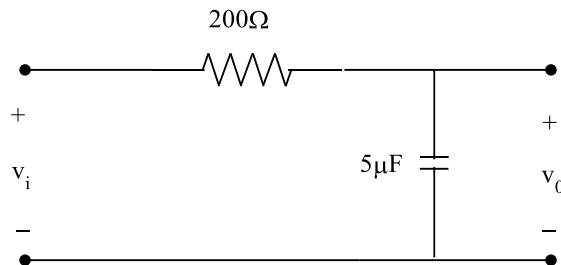
200Ω

+

v_i

5µF

+

v_0

−

−

Fig.2.