

EECS/CSE 70A Network Analysis I

Homework #5

Due on or before

5/24/2016, Tuesday 6.00pm at ELH 110

(You can turn in homework assignments during any of the discussion sessions and office hours before the deadline)

Problem 1 (20pts)

Part (a): $u = (A + jB)(C + jD)$

Find $\operatorname{Re}\{u\}$
 $\operatorname{Im}\{u\}$

Express u as $u = x + iy$
 $u = re^{j\phi}$

Find $\operatorname{Re}\{ue^{j\omega t}\}$

Part (b): $u = \frac{A + jB}{C + jD}$

Find $\operatorname{Re}\{u\}$
 $\operatorname{Im}\{u\}$

Express u as $u = x + iy$
 $u = re^{j\phi}$

Find $\operatorname{Re}\{ue^{j\omega t}\}$

Problem 2 (20pts)

(a) Convert the phasor $V = 5 + j3$ to time domain expression $v(t)$.

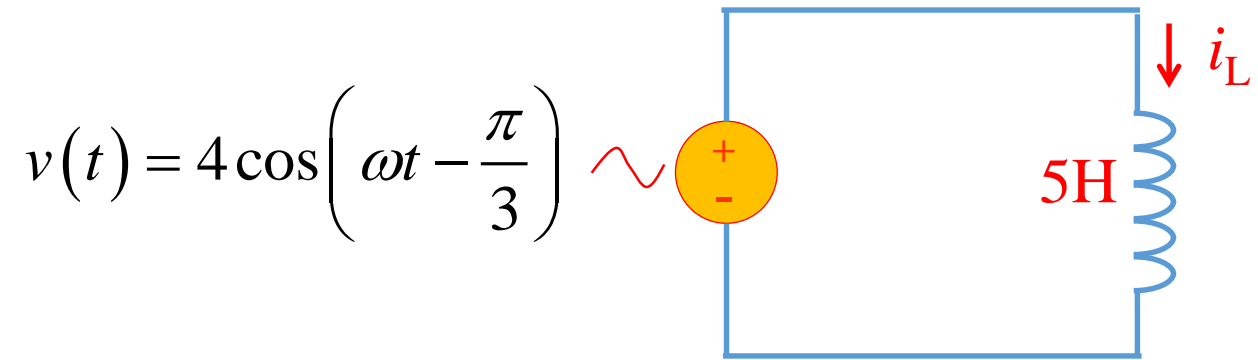
(b) Convert the phasor $I = 15 - j8$ to time domain expression $i(t)$.

(c) Convert $v(t) = 12 \sin\left(\omega t - \frac{\pi}{6}\right)$ to the phasor domain both in Cartesian and polar forms $V = x + jy = re^{i\phi}$

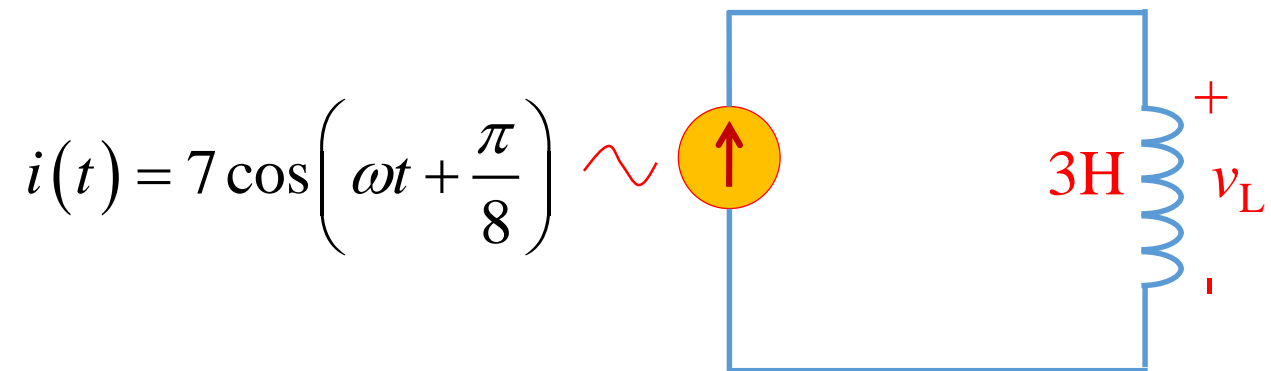
(d) Convert $i(t) = 4 \cos\left(\omega t + \frac{\pi}{4}\right)$ to the phasor domain both in Cartesian and polar forms $I = x + jy = re^{i\phi}$

Problem 3 (30pts.)

Part (a): Find the current $i_L(t)$ at the frequency 80Hz.

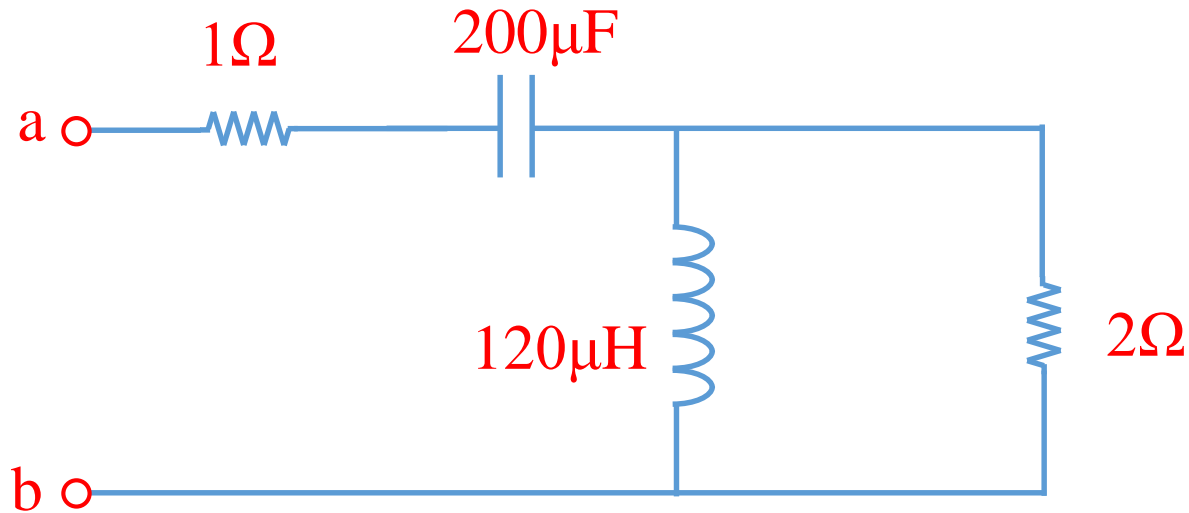


Part (b): Find the voltage $v_L(t)$ at the frequency 30Hz.



Problem 4 (30pts.)

Part (a): Find the impedance seen from terminals a-b as a function of the angular frequency ω .



Part (b): Evaluate the impedance at 750Hz

Part (c): Evaluate the impedance at 3kHz