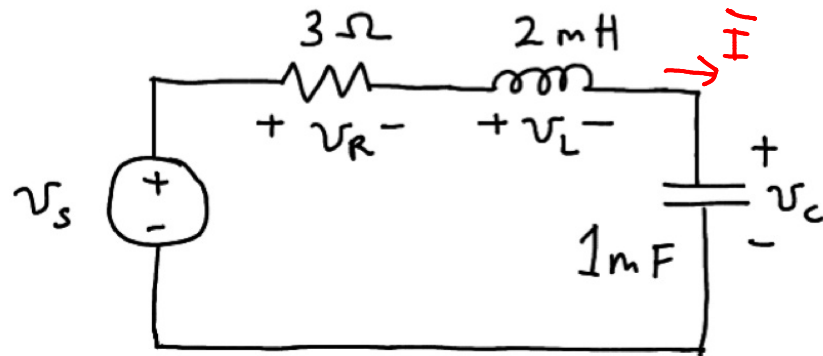


## Solution to quiz 5



$$\bar{V}_L = \bar{I} jX_L = (15 \angle 115^\circ)(2 \angle 90^\circ)$$

$$\bar{V}_L = 30 \angle 205^\circ$$

$$\therefore v_L(t) = 30 \cos(1000t + 205^\circ) \text{ V}$$

$$\bar{V}_R = \bar{I} R = 45 \angle 115^\circ \text{ V}$$

$$v_R(t) = 45 \cos(1000t + 115^\circ)$$

$$\text{Given } v_c(t) = 15 \cos(1000t + 25^\circ)$$

$$\Rightarrow \bar{V}_c = 15 \angle 25^\circ \text{ V}$$

$$\therefore \bar{I} = \frac{\bar{V}_c}{-jX_c}, \text{ where } -jX_c = -j1\ \Omega$$

$$\bar{I} = \frac{15 \angle 25^\circ}{-j1} = 15 \angle 115^\circ$$

$$\bar{V} = \bar{V}_R + \bar{V}_C + \bar{V}_L$$

$$= 45 \angle 115^\circ + 15 \angle 25^\circ + 30 \angle 205^\circ$$

$$= -19.02 + j40.8 + 13.6 + j6.3 - 27.2 - j12.7$$

$$= -32.6 + j34.4$$

$$= 47.4 \angle 133.46^\circ \Rightarrow v_s(t) = 47.4 \cos(1000t + 133.46^\circ) \text{ V}$$

