Chris Hunt HW8 ENGR 202

8.1) $v(t) = 120\cos(377t)$ V $\quad i(t) = 2\sin(377t - 25°)$ A $= 2\cos(377t - 115°)$ A

Find $p(t)$: $\frac{1}{2}V_m I_m(\cos(\theta_v - \theta_i) + \cos(2\omega t + \theta_v + \theta_i))$

$$p(t) = 120\left(\cos(115) + \cos(377t - 115°)\right) \text{ watts}$$

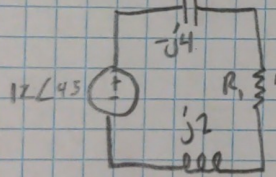
8.2) Find average power when $V = 12\angle 45$ V $\quad I = 2\angle 25$ A

$$P = \frac{1}{2}V_m I_m \cos(\theta_v - \theta_i)$$

$$P = \frac{1}{2}(12)(2)\cos(20°)$$

$$P = 11.28 \text{ watts average power}$$

8.3) Find average power absorbed by R_1



$$Z_{tot} = 4 - j2$$

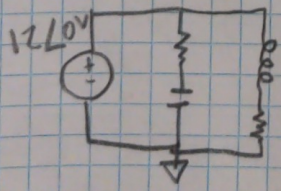
$$I = \frac{12\angle 45}{4 - j2} = .85 + j2.5 \text{ A} = 2.68\angle 71.6° \text{ A}$$

$$V_{R_1} = (.85 + j2.5 \text{ A})(4\,\Omega) = 3.39 + j10.18 = 10.73\angle 71.6° \text{ V}$$

$$P = \frac{1}{2}(2.68)(10.73)\cos(71.6 - 71.6)$$

$$P = 14.38 \text{ watts absorbed by } R_1$$

8.4) Find average power supplied by the source



$$Z_{eq} = \frac{(1 - j2)(2 + j2)}{3} = 2 - j.667\ \Omega$$

$$I_s = \frac{12\angle 0°}{2 - j.667\,\Omega} = 5.4 + j1.8 \text{ A} = 32.4\angle 18.43° \text{ A}$$

$$P = \frac{1}{2}(12)(32.4)\cos(-18.43°)$$

$$P = 184.43 \text{ watts average power}$$