作 业 纸

课程名称：_____

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8-4：(1)(a)

$4\cos(2t)+3\sin(2t)$

$=5\left(\frac{4}{5}\cos(2t)+\frac{3}{5}\sin(2t)\right)$

$=5(\cos 36.8^\circ\cos 2t+\sin 36.9^\circ\sin 2t)$

$=5\cos(2t-36.8^\circ)$

$\dot{A}=5\angle -36.8^\circ$

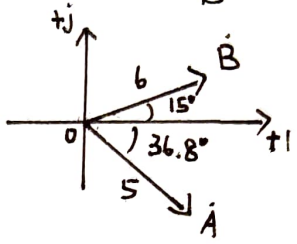
(b)

$-6\sin(5t-75^\circ)$

$=6\cos(5t-75^\circ+90^\circ)$

$=6\cos(5t+15^\circ)$

$\dot{B}=6\angle 15^\circ$



(2)(a) $6-j8$

$=\sqrt{36+64}\angle\arctan\left(\frac{-8}{6}\right)$

$=10\angle -53.1^\circ$

α 响应 $=10\cos(\omega t-53.1^\circ)$

(b) $-8+j6$

$=10\angle\arctan\left(\frac{6}{-8}\right)$

$=10\angle 180^\circ-33.9^\circ$

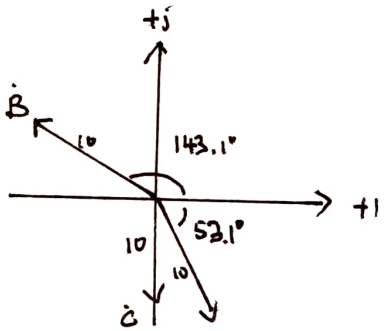
$=10\angle 143.1^\circ$

β 响应 $=10\cos(\omega t+143.1^\circ)$

(c) $-j10$

$=10\angle -90^\circ$

γ 响应 $=10\cos(\omega t-90^\circ)$



8-6：(2) $\dot{F}_1=6\angle -72^\circ$

$\dot{F}_2=12\angle 150^\circ-90^\circ$

$=12\angle 60^\circ$

$\dot{F}_1+\dot{F}_2=6\angle -72^\circ+12\angle 60^\circ$

$=1.854-j5.706+j10.392+6$

$=7.854+j4.686$

$=9.146\angle 30.82^\circ$

$\dot{F}_1-\dot{F}_2=6\angle -72^\circ-12\angle 60^\circ$

$=1.854-j5.706-j10.392-6$

$=-4.146-j16.098$

$=-16.62\angle 75.56^\circ$

联系方式：_____

8-9：(1) $\dot{U}_m = 12\angle 30^\circ$

$\dot{I}_{pm} = \frac{\dot{U}_m}{R}$

$= 3\angle 30^\circ$ mA

$i_p(t) = 3\cos(1000t + 30^\circ)$ mA

(2) $\dot{I}_{Lm} = \frac{\dot{U}_m}{j\omega L}$

$= \frac{12\angle 30^\circ}{20\angle 90^\circ}$

$= 0.6\angle -60^\circ$ A

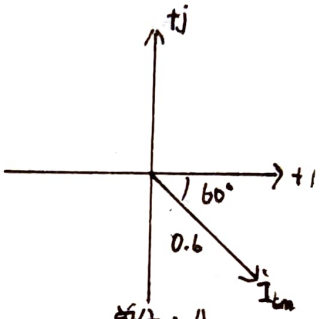
$i_L(t) = 0.6\cos(1000t - 60^\circ)$ A

(3) $\dot{I}_{cm} = j\omega C\dot{U}_m$

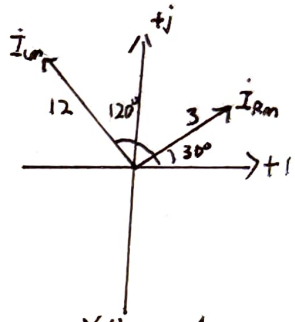
$= (10^{-3}\angle 90^\circ \times 12\angle 30^\circ)$ A

$= 12\angle 120^\circ$ mA

$i_c(t) = 12\cos(1000t + 120^\circ)$ mA



单位：A



单位：mA

8-11：(3) $Z = \frac{100\angle 30^\circ}{5\angle -60^\circ}\ \Omega$

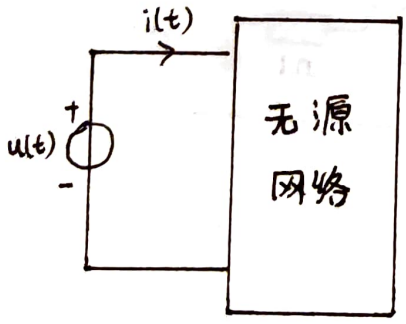
$= 20\angle 90^\circ\ \Omega$

$= j20\ \Omega$

$Y = \frac{1}{Z}$

$= 0.05\angle -90^\circ$ S

$= -j0.05$ S



(b) $u(t) = [-5\cos 2t + 12\sin 2t]$ V

$= (-5\angle 0^\circ + 12\angle -90^\circ)$ V

$= (-5 - j12)$ V

$= -13\angle 67.58^\circ$ V

$= -13\cos(2t - 67.38^\circ)$ V

$Z = \frac{-13\angle 67.38^\circ}{1.3\angle 90^\circ}\ \Omega$

$= -10\angle 27.58^\circ\ \Omega$

$= 10\angle 152.62^\circ\ \Omega$

$Y = \frac{1}{Z}$

$= 0.1\angle 152.62^\circ$

联系方式：_____

8-13: $i(t) \Rightarrow (8\angle 0° - 11\angle -90°)A$

$= (8 + j11)A$

$= 13.6 \angle 53.97° A$

$= \dot{I}_m$

$u(t) \Rightarrow (1\angle -90° + 2\angle 0°)V$

$= (2 - j1)V$

$= \sqrt{5} \angle -26.56° V$

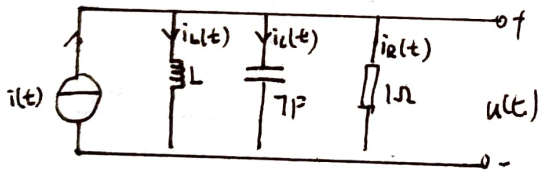
$= \dot{U}_m$

$\dot{I}_{Rm} = \frac{\dot{U}_m}{1\Omega}$

$= \sqrt{5} \angle -26.56° A$

$i_R(t) = \sqrt{5}\cos(t - 26.56°)A$

$= 2.236\cos(t - 26.56°)A$



$\dot{I}_{cm} = jwC\dot{U}_m$

$= (7\angle 90° \times 2.236 \angle 26.56°)A$

$= 15.68 \angle 63.44° A$

$= 15.68\cos(t + 63.44°)A$

$\dot{I}_{Lm} = \dot{I}_m - \dot{I}_{cm} - \dot{I}_{Rm}$

$= (13.6\angle 53.97° - 15.68\angle 63.44° - 2.236\angle -26.56°)A$

$= (8 + j11 - 7 - j14 - 2 + j1)A$

$= (-1 - j2)A$

$= 2.236 \angle -116.56° A$

$i_L = 2.236\cos(t - 116.5)A$

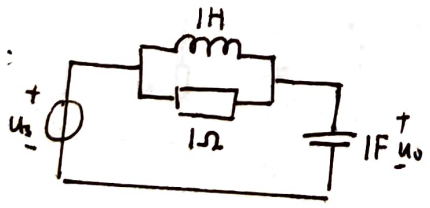
$jwL = \frac{\dot{U}_m}{\dot{I}_{Lm}}$

$= \frac{2.236 \angle -26.56°}{2.236 \angle -116.5°}$

$= 1 \angle 90° \Omega$

$\therefore L = 1H$

8-15:



$Z = \frac{j1}{1 + j1}\Omega$

$= 0.5 + j0.5\Omega$

$\dot{U}_{om} = \dot{U}_{sm}\frac{-j}{0.5 + j0.5 - j1}$

$= \frac{U_{sm} \angle 0° \times \angle -90°}{\frac{\sqrt{2}}{2} \angle -45°}$

$= \sqrt{2}\, U_{sm} \angle -45°$

$u_o(t) = \sqrt{2}\, U_{sm}\cos(t - 45°)V$

联系方式:_____

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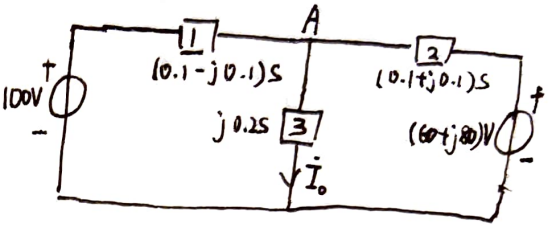
8-18 (1) $(5+j5-j5)\dot{I}_1-(-j5)\dot{I}_2=100$

$-(-j5)\dot{I}_1+(5-j5-j5)\dot{I}_2=-100\angle 53.1°$

化简为

$\dot{I}_1+j\dot{I}_2=20$

$j\dot{I}_1+(1-j2)\dot{I}_2=-12-j16$



(2) $(0.1-j0.1+j0.2+0.1+j0.1)\dot{U}_A=100(0.1-j0.1)+(60+j80)(0.1+j0.1)$

8-25：

$$Z=j\omega L+\frac{1}{\frac{1}{25}+j8000\times10^{-5}}$$

$$=j\omega L+\frac{25}{1+j2}$$

$$=\frac{j\omega 5L+25-j50}{5}$$

$$=5+j(\omega L-10)$$

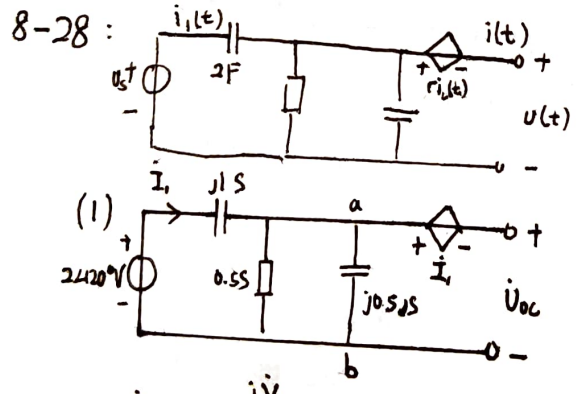
当 $\omega L-10=0$，

$$L=\frac{10}{\omega}$$

$$=\frac{1}{600}$$

$$=1.25\ mH$$

8-28：



(1)

$$\dot{U}_{ab}=\frac{j\dot{V}_s}{0.5+j1.5}$$

$$\dot{I}_1=j(\dot{U}_s-\dot{U}_{ab})$$

$$\dot{U}_{oc}=-\dot{I}_1+\dot{U}_{ab}$$

$$=-j(\dot{U}_s-\dot{U}_{ab})+\dot{U}_{ab}$$

$$=(1+j)\frac{j\dot{V}_s}{0.5+j1.5}-j\dot{V}_s$$

$$=j\dot{V}_s\left(\frac{1+j}{0.5+j1.5}-1\right)$$

$$=j\dot{U}_s\frac{0.5-j0.5}{0.5+j1.5}$$

$$=j\dot{U}_s\frac{1-j}{1+j3}$$

$$=\frac{1+j}{1+j3}\dot{U}_s$$

$$=\frac{1.414\angle 45°}{3.162\angle 71.56°}\times 2\angle 120°$$

$$=0.8944\angle 93.44°$$

联系方式：_____

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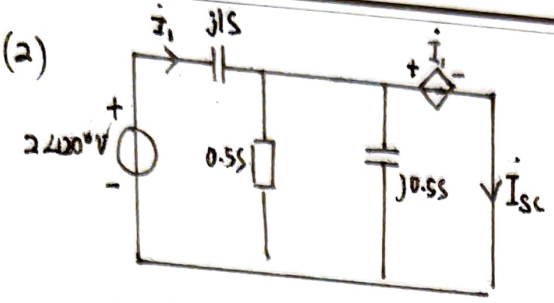
8-28 (2)



0.5S 支路电流 $= \dot{I}_1 \times 0.5$

$= 0.5\dot{I}_1$

j0.5S 支路电流 $= j0.5\dot{I}_1$

$\dot{I}_{sc} = \dot{I}_1 - 0.5\dot{I}_1 - j0.5\dot{I}_1$

$= (0.5 - j0.5)\dot{I}_1$

$j1(\dot{U}_s - \dot{I}_1) = \dot{I}_1$

$(1+j1)\dot{I}_1 = j1\dot{U}_s$

$\dot{I}_1 = \frac{j1}{1+j1}\dot{U}_s$

$\therefore \dot{I}_{sc} = (0.5 - j0.5)\frac{j1}{1+j1}\dot{U}_s$

$= 0.5\dot{U}_s$

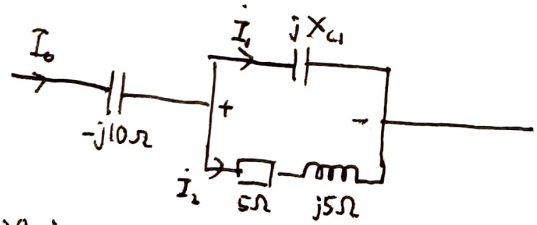
(3) $Z_0 = \frac{\dot{U}_{oc}}{\dot{I}_{sc}}$

$= \frac{1+j1}{1+j3}\dot{U}_s \times \frac{1}{0.5\dot{U}_s}$

$= \left(2 \times \frac{1+j1}{1+j3}\right)\Omega$

$= 0.8944 \angle -26.56°\ \Omega$

8-37：



设 $\dot{U}_1$ 为参考相量

$\dot{U}_1 = 100 \angle 0°$

$\therefore \dot{I}_1 = j10A$

$\dot{I}_2 = \frac{\dot{U}_1}{5+j5}$

$= \frac{100\angle 0°}{5\sqrt{2}\angle 45°}A = 10 - j10A$

$\dot{I}_0 = \dot{I}_1 + \dot{I}_2$

$= (j10 + 10 - j10)A$

$= 10A$

$\therefore$ A0 读数为 10A

$\dot{U}_0 = \dot{U}_1 + jX_C\dot{I}_0$

$= (100 - j10 \times 10)V$

$= 100\sqrt{2} \angle -45° V$

$\therefore$ V0 读数为 141.4 V

联系方式：