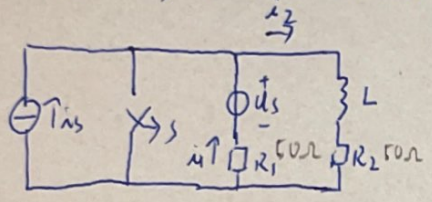
10-32.

已知 $i_S=2A$, $u_S=100\sin(1000t+90°)V$, $L=0.1H$, $R_1=R_2=50\Omega$, $T_0=0$ 时，求 $i_1(t)$ 和 $i_2(t)$.



$T<0$ 时，$i_1(t)=\frac{u_S}{R_1}=2\sin(1000t+90°)A$

$i_2(t)=0$

$i_L(0^+)=i_2(0^-)=0$

S 断开，$i_1(0^+)=-i_S=-2A$

① i_S 单独作用　$\tau=\frac{L}{R_1+R_2}=10^{-3}s$.

$i_1(\infty)=-1A$　$i_2(\infty)=1A$

$i_{11}(t)=-1-e^{-1000t}A$

$i_{21}(t)=1-e^{-1000t}A$

② u_S 单独作用　$i_1(0^+)=0$

$i_1(\infty)=i_2(\infty)=\frac{\dot U_S}{Z}=\frac{50\Omega\angle90°}{100+100j}=0.5\angle45°$

$i_{12}(t)=i_1(\infty)+[i_1(0^+)-i_1(\infty)|_{t=0^+}]e^{-1000t}$

$=0.707\sin(1000t+45°)-0.5e^{-1000t}$

$i_{22}(t)=0.707\sin(1000t+45°)-0.5e^{-1000t}$

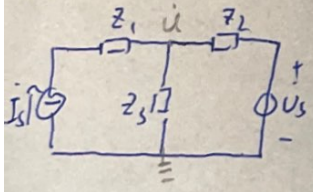
即　$i_1(t)=i_{11}(t)+i_{12}(t)$

$=0.707\sin(1000t+45°)-1-1.5e^{-1000t}$.

$i_2(t)=i_{21}(t)+i_{22}(t)$

$=0.707\sin(1000t+45°)+1-1.5e^{-1000t}A$

2. $\dot U_S=100\angle30°V$, $\dot I_S=4\angle60°A$, $Z_1=Z_3=50\angle30°$, $Z_2=50\angle-30°$, 求复功率.



$(\frac{1}{Z_3}+\frac{1}{Z_2})\dot u=I_S-\frac{\dot U_S}{Z_2}$

$\dot u=57.74\angle60°$

$\dot U_1=\dot u+\dot I_S Z_1=28.87+250j$

$\bar S=\dot U\cdot\dot I_S^*=923.76+400j$

5-46.

并联电容前：　并联电容后：

$P_1=UI\cos\varphi_1$　$P_1+P_2=UI_m\cos\varphi_2$

$\cos\varphi_1=0.600$　$\cos\varphi_2=0.867$

$Q_C=P_1\tan\varphi_1-(P_1+P_2)\tan\varphi_2$

$=2036\ var$

$Q_C=\frac{U^2}{\frac{1}{\omega C}}$　功率因数 0.867.

$C=133.7\mu F$