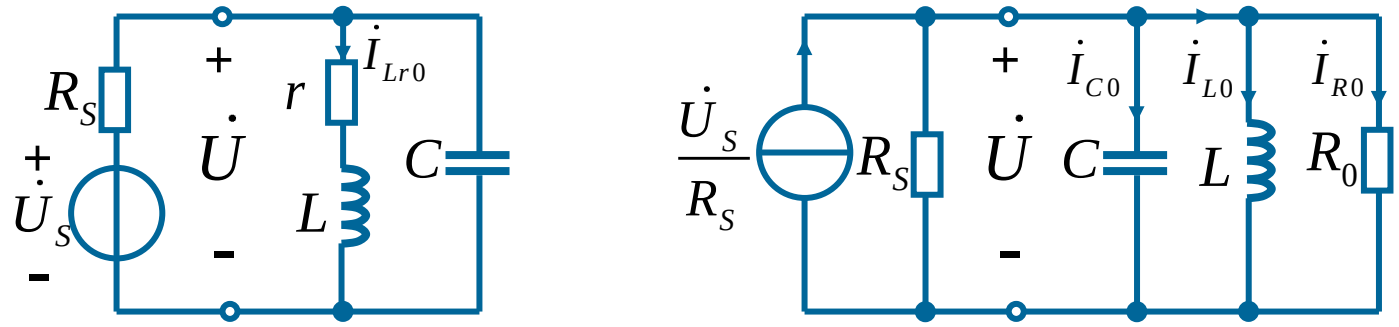
10-11 题图10-11所示并联谐振电路，$L=0.1mH, C=100\,pF$，$r=10\Omega, R_S=100k\Omega, \dot{U}_S=2\angle 0^\circ$，试求(1)谐振角频率$\omega_0$；(2)端电压$\dot{U}$；(3)整个电路的品质因数$Q'$；(4)谐振时电容支路电流$\dot{I}_{C0}$及电感支路电流$\dot{I}_{Lr0}$。

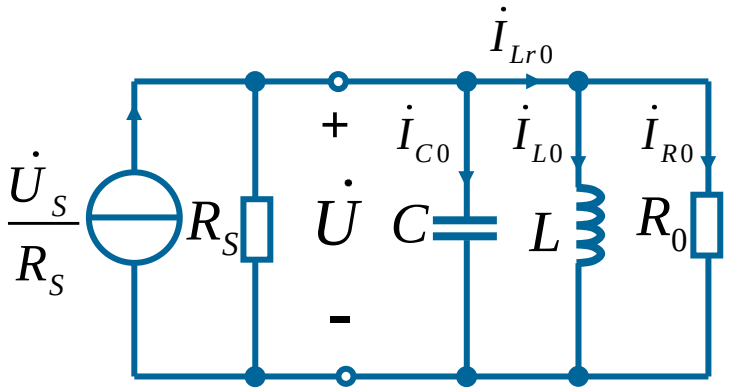


解：这是一个实际的并联谐振电路，其等效电路如右图所示；且：$R_0=\dfrac{L}{Cr}=100k\Omega$

(1) $\omega_0=\dfrac{1}{\sqrt{LC}}=10^7\,rad/s$

(2) $\dot{U}=\dfrac{\dot{U}_S}{R_S}\times(R_S\,//\,R_0)=1\angle 0^\circ V$

(3) $Q'=\dfrac{\omega_0 C}{G}=\omega_0 CR=\omega_0 C(R_S\,//\,R_0)=50$



(4) $\dot{I}_{C0} = jQ' \cdot \dfrac{\dot{U}_S}{R_S} = 1\angle 90^\circ mA$ （或 $\dot{I}_{C0} = j\omega_0 C\dot{U}$）

$$\dot{I}_{L0} = -\dot{I}_{C0} = 1\angle -90^\circ mA$$

$$\dot{I}_{R0} = \frac{\dot{U}_S}{R_S} \cdot \frac{R_S}{R_S + R_0} = 0.01\angle 0^\circ mA$$

$$\therefore \dot{I}_{Lr0} = \dot{I}_{L0} + \dot{I}_{R0} = 0.01\angle 0^\circ + 1\angle -90^\circ = 0.01 - j1mA$$