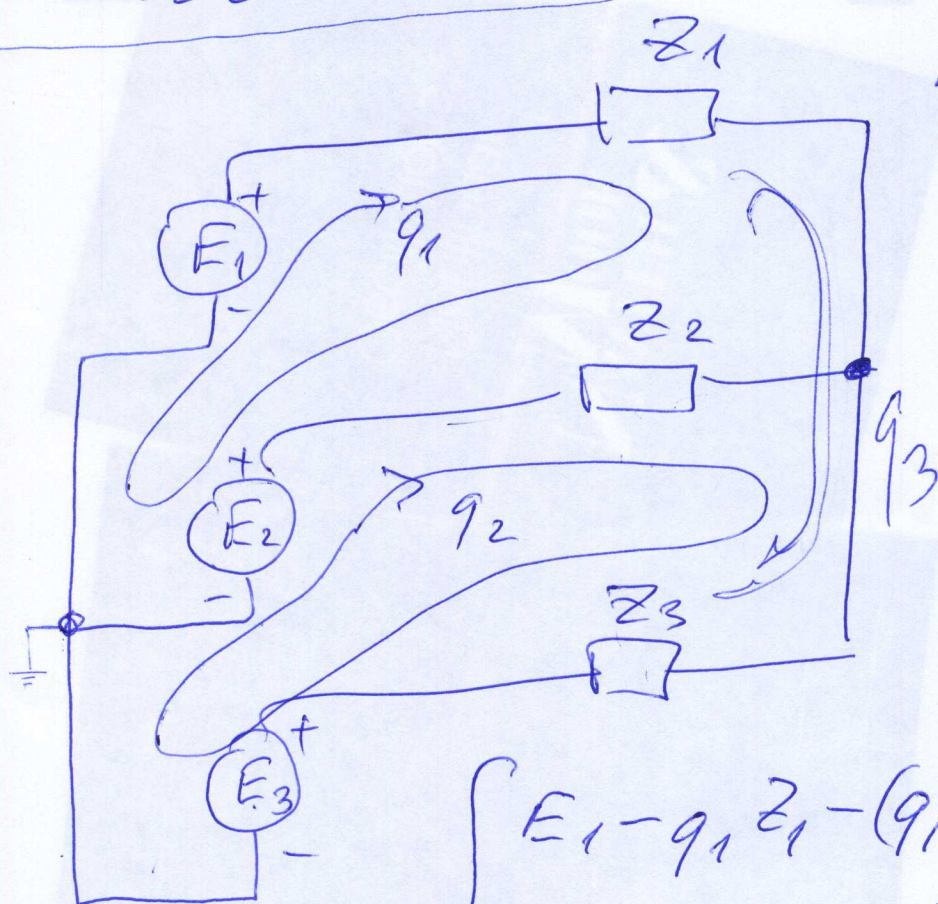


$$(z_1 + z_2) - z_2 = 0$$

$$\begin{cases} E_1 - (q_1 + q_3)z_1 - \\ - (q_3 + q_2)z_3 - E_3 = 0 \end{cases}$$



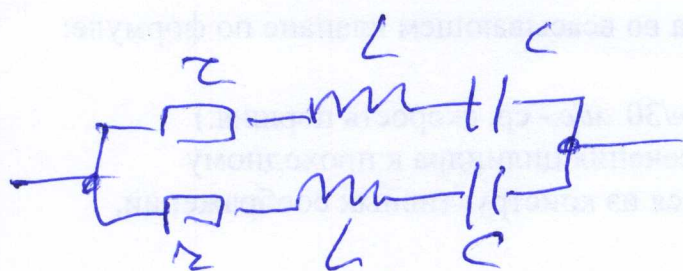
$$\begin{cases} E_1 - q_1 z_1 - (q_1 - q_2)z_2 - E_2 = 0 \\ E_2 - (q_2 z_2 - q_1)z_2 - q_2 z_3 - E_3 = 0 \end{cases}$$



$$E_1 - q_1 z_1 - (q_1 - q_2) z_2 - E_2 = 0$$

$$E_2 - (q_2 - q_1) z_2 - q_2 z_3 - E_3 = 0$$

$$\begin{aligned} q_1(z_1 + z_2) - q_2 z_2 &= -E_1 + E_2 \\ -q_1 z_2 + q_2(z_2 + z_3) &= E_3 - E_2 \end{aligned}$$



$$Z = \frac{1}{2} \left( Z + j\omega L + \frac{1}{j\omega C} \right)$$

$$E_1 = E e^{i\omega t}$$

$$E_2 = E e^{i\omega t + \frac{2\pi}{3}}$$

$$E_3 = E e^{i\omega t + \frac{4\pi}{3}}$$

$$\cancel{q_1 = Q_1 e^{i\omega t + \alpha_1}} \quad \cancel{q_2 = Q_2 e^{i\omega t + \alpha_2}}$$

$$E_1 = E e^{i\omega t} \quad E_2 = 0 \quad E_3 = 0$$

$$q_1^{(1)} = Q_1 e^{i\omega t} \quad q_2^{(1)} = Q_2 e^{i\omega t}$$

$$E_1 = 0 \quad E_2 = E e^{i\omega t + \frac{2\pi}{3}}$$

$$q_1^{(2)} = Q_1 e^{i\omega t + \frac{2\pi}{3}}$$

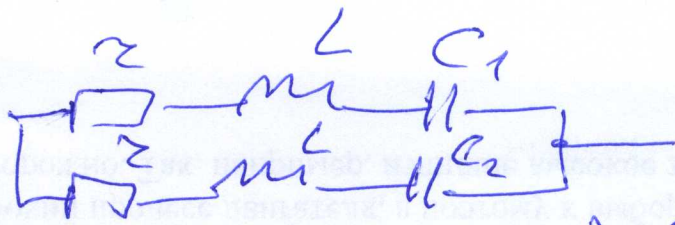
$$E_1 = 0 \quad E_2 = 0$$

$$q_1^{(3)} = Q e^{i\omega t + \frac{4\pi}{3}}$$

$$E_3 = E e^{i\omega t + \frac{4\pi}{3}}$$

$$q = q_1^{(1)} + q_2^{(2)} + q_1^{(3)}$$





$$\beta = \sqrt{-1}$$

$$Z = \frac{(R + j\omega L + \frac{1}{j\omega C_1})(R + j\omega L + \frac{1}{j\omega C_2})}{1} =$$

$$2R + 2j\omega L + \frac{1}{j\omega C_1} + \frac{1}{j\omega C_2}$$

$$= \frac{1}{(j\omega C_1)(j\omega C_2)} (j\omega 2R C_1 + L C_1 \omega^2) (j\omega 2R C_2 + L C_2 \omega^2)$$

$$= \frac{-2R\omega^2 C_1 C_2 + 2j\omega^3 L C_1 C_2 + j\omega C_1 + j\omega C_2}{1} = \omega_1^2$$

$$R C_1 = R_1$$

$$R C_2 = R_2$$

$$\frac{1}{L C_2} = \omega_2^2$$

$$j\omega \left[ C_1 + C_2 - \omega^2 L C_1 C_2 \right]$$

$$\left[ 1 + \frac{C_2}{C_1} - \omega^2 / \omega_2^2 \right]$$