$$1 - \omega_1^2 L_1 C_1 = \frac{\omega_1}{\omega_2}\left[\omega_2^2 L_1 C_1 - 1\right] \quad (5)$$

from (1)

$$L_1 C_1 = \frac{1}{\omega_0^2} \quad (6)$$

$$\therefore \quad 1 - \frac{\omega_1^2}{\omega_0^2} = \frac{\omega_1}{\omega_2}\left(\frac{\omega_2^2}{\omega_0^2} - 1\right]$$

$$\Rightarrow \quad 1 - \frac{f_1^2}{f_0^2} = \frac{f_1}{f_2}\left(\frac{f_2^2}{f_0^2} - 1\right)$$

$$\frac{f_0^2 - f_1^2}{\cancel{f_0^2}} = \frac{f_1}{f_2}\left(\frac{f_2^2 - f_0^2}{\cancel{f_0^2}}\right)$$

$$f_0^2 f_2 - f_1^2 f_2 = f_1 f_2^2 - f_0^2 f_1$$

$$f_0^2(\cancel{f_2 + f_1}) = f_1 f_2(\cancel{f_2 + f_1})$$

$$f_0^2 = f_1 f_2 \quad (7)$$

$$\boxed{f_0 = \sqrt{f_1 f_2}}$$

The frequency of resonance of the individual arms should be the geometric mean of the two freq's of cut-off.

Revision

* If flee filter is terminated in a load $R = R_K$.

The value of the circuit components are, determined in terms of $R$ & $f_1$ & $f_2$.

At lower cut-off freq

(*) $\frac{1}{\omega_1 C_1} - \omega_1 L_1 = 2R.$

$\frac{1 - \omega_1^2 L_1 C_1}{\omega_1 C_1} = 2R$

$1 - \omega_1^2 L_1 C_1 = 2R\omega_1 C_1$

from (6) $1 - \frac{\omega_1^2}{\omega_0^2} = 2R\omega_1 C_1 \Rightarrow 1 - \frac{f_1^2}{f_0^2} = 4\pi R f_1 C_1$

Sub $f_0 = f_1 f_2$ from (2)

$1 - \frac{f_1}{f_2} = 4\pi R f_1 C_1 \Rightarrow \frac{f_2 - f_1}{f_2} = 4\pi R f_1 C_1$

$C_1 = \frac{f_2 - f_1}{4\pi R f_1 f_2}$ — (8)