Because the applied Voltage is common to both branches,

$$V_L = V_C$$

so that $$\frac{V_L}{X_L} = \frac{V_C}{X_C} \quad , \quad I_L = I_C.$$

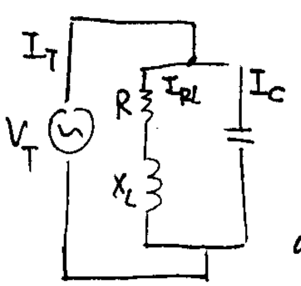
and I_L Lags the applied V_T 90° while I_C leads by 90°, so their phase difference is 180°, therefore, I_L and I_C Vector sum is zero, ∴ total current $I_T = 0$. Under this condition, the impedance of circuit at the resonant frequency must be infinite in value.

The formula for the resonant frequency of a pure LC parallel-tuned circuit is the same as that for a series tuned circuit

$$f_r = \frac{1}{2\pi\sqrt{LC}} = 0.159/\sqrt{LC}$$

$$\therefore \quad L = 0.0254/f_r^2 C$$

$$C = 0.0254/f_r^2 L.$$



In a practical LC parallel-tuned circuit, there's some resistance, most of which is due to the resistance of the inductor wire. The resonant frequency of a parallel circuit also is defined as that frequency at which the parallel circuit acts as a pure resistance, therefore, the line current I_T must be in phase with the ~~parallel circuit~~ applied V_T. This means that the out of phase or quadrature component of the current