

$$\begin{cases}
\overline{Y} = \frac{1}{R} + \frac{1}{L_1 \cdot \omega \cdot j} + \frac{1}{L_2 \cdot \omega \cdot j} - \frac{C_1 \cdot \omega}{j} - \frac{C_2 \cdot \omega}{j} \\
\overline{Y} = \frac{1}{R} + j \cdot \left[ (C_1 + C_2) - \left( \frac{1}{L_1} + \frac{1}{L_2} \right) \right]
\end{cases} \tag{2.1}$$

The circuit behave as if has a parallel equivalent capacity C

$$C = C_1 + C_2 \tag{2.2}$$

and a parallel equivalent inductance L

$$\begin{cases} \frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2} \\ L = \frac{L_1 L_2}{L_1 + L_2} \end{cases}$$
 (2.3)

The complex admittance of the circuit may be written as

$$\overline{Y} = \frac{1}{R} + j \cdot \left( C \cdot \omega - \frac{1}{L \cdot \omega} \right) \tag{2.4}$$

and the complex impedance of the circuit will be

$$\begin{cases}
\overline{Z} = \frac{1}{\overline{Y}} \\
\overline{Z} = \frac{\frac{1}{R} + j \cdot \left(\frac{1}{L \cdot \omega} - C \cdot \omega\right)}{\sqrt{\left(\frac{1}{R}\right)^2 + \left(C \cdot \omega - \frac{1}{L \cdot \omega}\right)^2}}
\end{cases} (2.5)$$

The impedance Z of the circuit, the inverse of the admittance of the circuit Y is the modulus of the complex impedance  $\overline{Z}$ 

$$Z = \left| \overline{Z} \right| = \frac{1}{\sqrt{\left(\frac{1}{R}\right)^2 + \left(C \cdot \omega - \frac{1}{L \cdot \omega}\right)^2}} = \frac{1}{Y}$$
 (2.6)

The constant current source supplying the circuit furnish a current having a momentary value i(t)

$$i(t) = I \cdot \sqrt{2} \cdot \sin(\omega \cdot t), \tag{2.7}$$

where I is the effective intensity (constant), of the current and  $\omega$  is the current pulsation (that can vary). The potential difference at the jacks of the circuit has the momentary value u(t)

$$u(t) = U \cdot \sqrt{2} \cdot \sin(\omega \cdot t + \varphi) \tag{2.8}$$

where U is the effective value of the tension and  $\varphi$  is the phase difference between tension and current.

The effective values of the current and tension obey the relation