1. Using the relation

$$F(z) = \frac{1}{2\pi} \int_{-\infty}^{\infty} e^{ikz} \tilde{F}(k)\, dk \ ,$$

we obtain

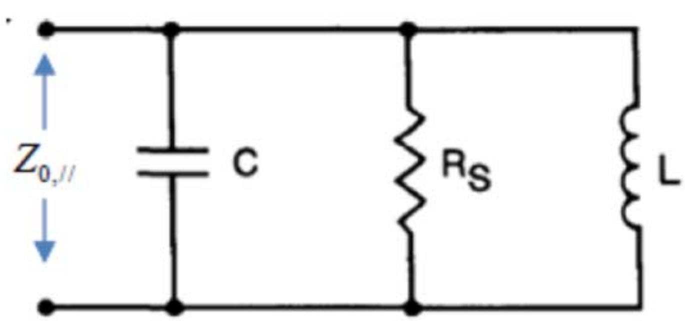
$$\begin{aligned}
\sum_{l=-\infty}^{\infty} F(lC) &= \frac{1}{2\pi} \sum_{l=-\infty}^{\infty} \int_{-\infty}^{\infty} e^{iklC} \tilde{F}(k)\, dk \\
&= \frac{1}{2\pi} \int_{-\infty}^{\infty} dk \tilde{F}(k) \sum_{l=-\infty}^{\infty} e^{i2\pi l \cdot \frac{kC}{2\pi}} \\
&= \frac{1}{2\pi} \int_{-\infty}^{\infty} dk \tilde{F}(k) \sum_{p=-\infty}^{\infty} \delta\left(\frac{kC}{2\pi} - p \right) \\
&= \frac{1}{2\pi} \sum_{p=-\infty}^{\infty} \int_{-\infty}^{\infty} \frac{2\pi \delta\left(k - \frac{2\pi p}{C} \right)}{C} \tilde{F}(k)\, dk \\
&= \frac{1}{C} \sum_{p=-\infty}^{\infty} \tilde{F}\left(\frac{2\pi p}{C} \right)
\end{aligned} \quad ,$$

where we also used

$$\delta(g(x)) = \sum_i \frac{\delta(x - x_i)}{|g'(x_i)|}$$

with x_i being the roots of $g(x)$.

2.



The impedance is determined by

$$
\begin{aligned}
\frac{1}{Z_{0,//}} &= \frac{1}{Z_R} + \frac{1}{Z_L} + \frac{1}{Z_C} \\
&= \frac{1}{R_s} + \frac{1}{j\omega L} + j\omega C \\
&= \frac{1 + jR_s\sqrt{\frac{C}{L}}\left(\omega\sqrt{LC} - \frac{1}{\omega\sqrt{LC}}\right)}{R_s} \; , \\
&= \frac{1 + jQ\left(\frac{\omega}{\omega_R} - \frac{\omega_R}{\omega}\right)}{R_s} \\
&= \frac{1 + iQ\left(\frac{\omega_R}{\omega} - \frac{\omega}{\omega_R}\right)}{R_s}
\end{aligned}
$$

i.e.

$$
Z_{0,//} = \frac{R_s}{1 + iQ\left(\frac{\omega_R}{\omega} - \frac{\omega}{\omega_R}\right)}
$$

where $j = -i$, $Q \equiv R_s\sqrt{\frac{C}{L}}$ and $\omega_R \equiv \frac{1}{\sqrt{LC}}$.