Synthesis of an LC two-port terminated in resistance at both ends - Forward divisions - Scaling

1 Synthesis of an LC two-port terminated in resistance at both ends

Consider the following squared module of the transmission coefficient $t(p)$:

$$|t(\mathrm{j}\omega)|^2 = \frac{1}{1+\omega^8} \tag{1}$$

Find the two LC two-ports terminated in resistance at both ends, that realize the given function $|t(\mathrm{j}\omega)|^2$.

2 Forward divisions

Using forward divisions, find the circuits corresponding to the following impedances:

a) $Z(s) = \dfrac{2s^2+4s+3}{s^3+2s^2+2s+1}$

b) $Z(s) = \dfrac{2s^3+5s^2+36s+15}{2s^2+5s+30}$

c) $Z(s) = \dfrac{2s^2+3s+2}{2s^3+7s^2+9s+5}$

3 Scaling

Consider the following circuit, where the components values are:
$C_2 = C_4 = 200\,\mathrm{pF}$, $L_3 = 3\,\mu\mathrm{H}$, $R_1 = R_4 = 75\Omega$

Find the scaling constants R_0 and ω_0 such that the components values became:
$c_2 = c_4 = 1\,\mathrm{F}$, $r_1 = r_4 = 1\Omega$.

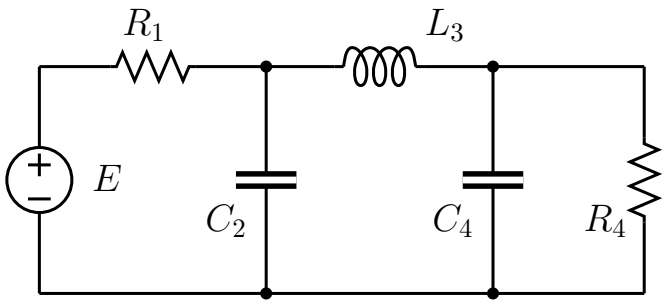

Figure 1: RLC circuit