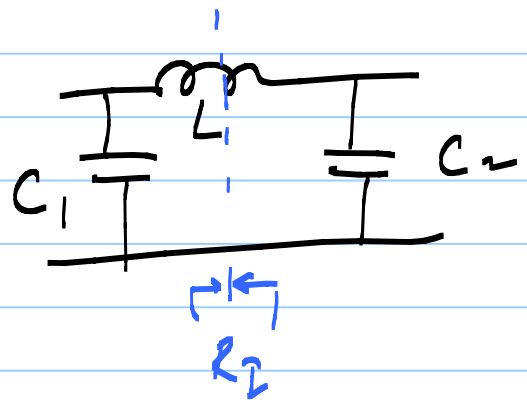
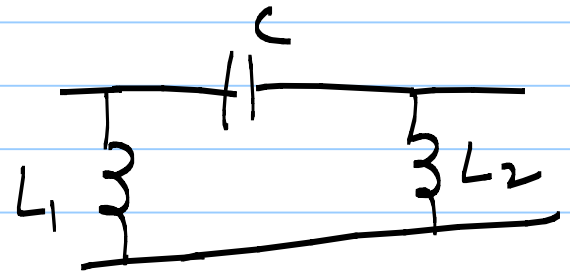
21/1/20

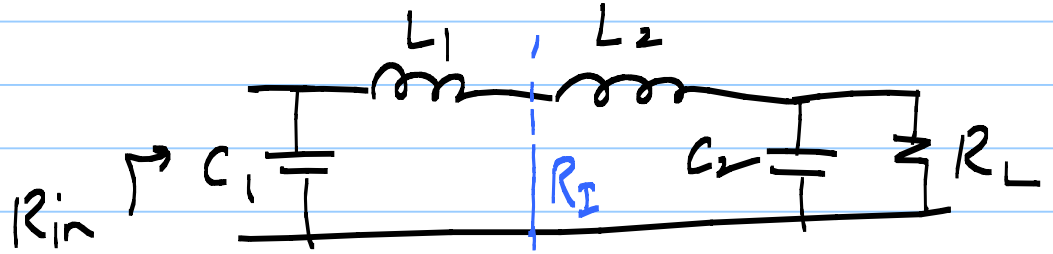
Lec4





E.g. π match, low pass, $f = 1\,GHz$,

$R_L = 50\Omega$, $R_{in} = 200\Omega$; $Q = 5$



$$Q = Q_L + Q_R = \sqrt{\frac{R_{in}}{R_I} - 1} + \sqrt{\frac{R_L}{R_I} - 1}$$

$$5 = \sqrt{\frac{200}{R_I} - 1} + \sqrt{\frac{50}{R_I} - 1}$$

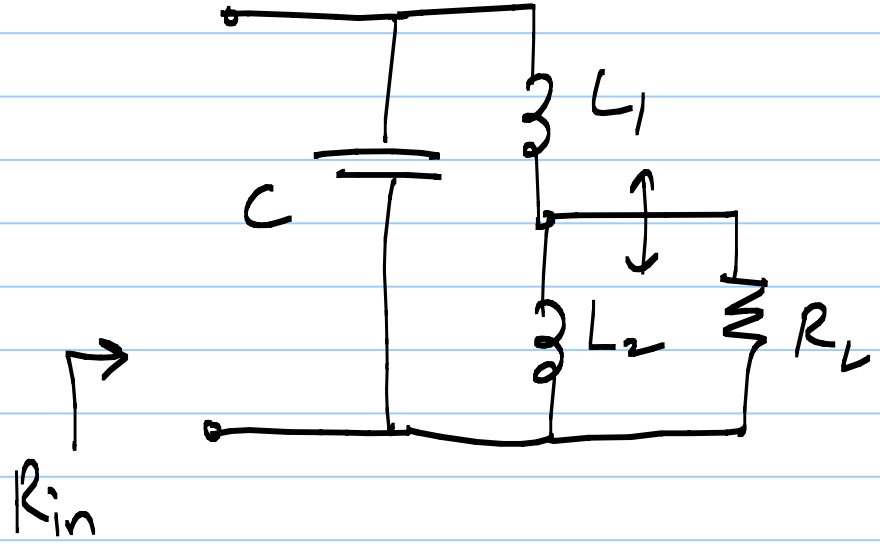
$$\sqrt{\frac{200}{R_I} - 1} = 5 - \sqrt{\frac{50}{R_I} - 1}$$

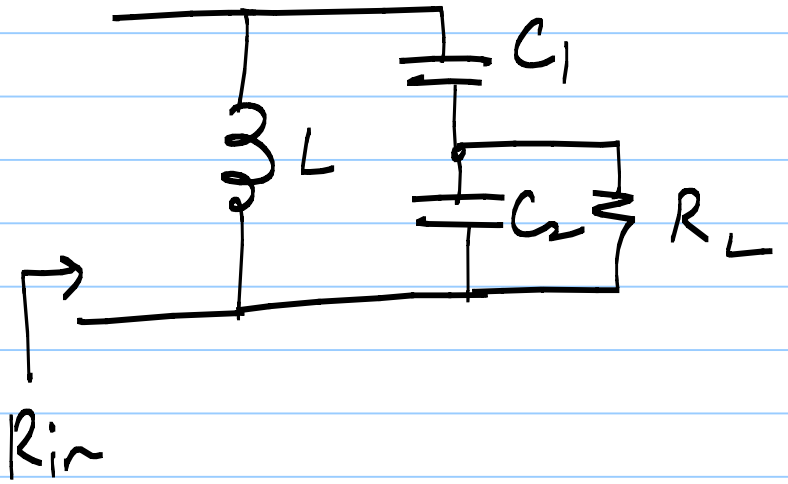
$$R_I = 15.2\,\Omega \longrightarrow$$

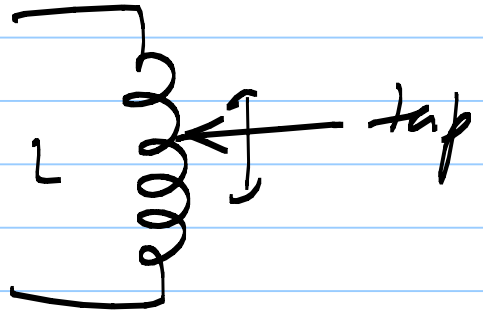
Design the two L-matches (HW)

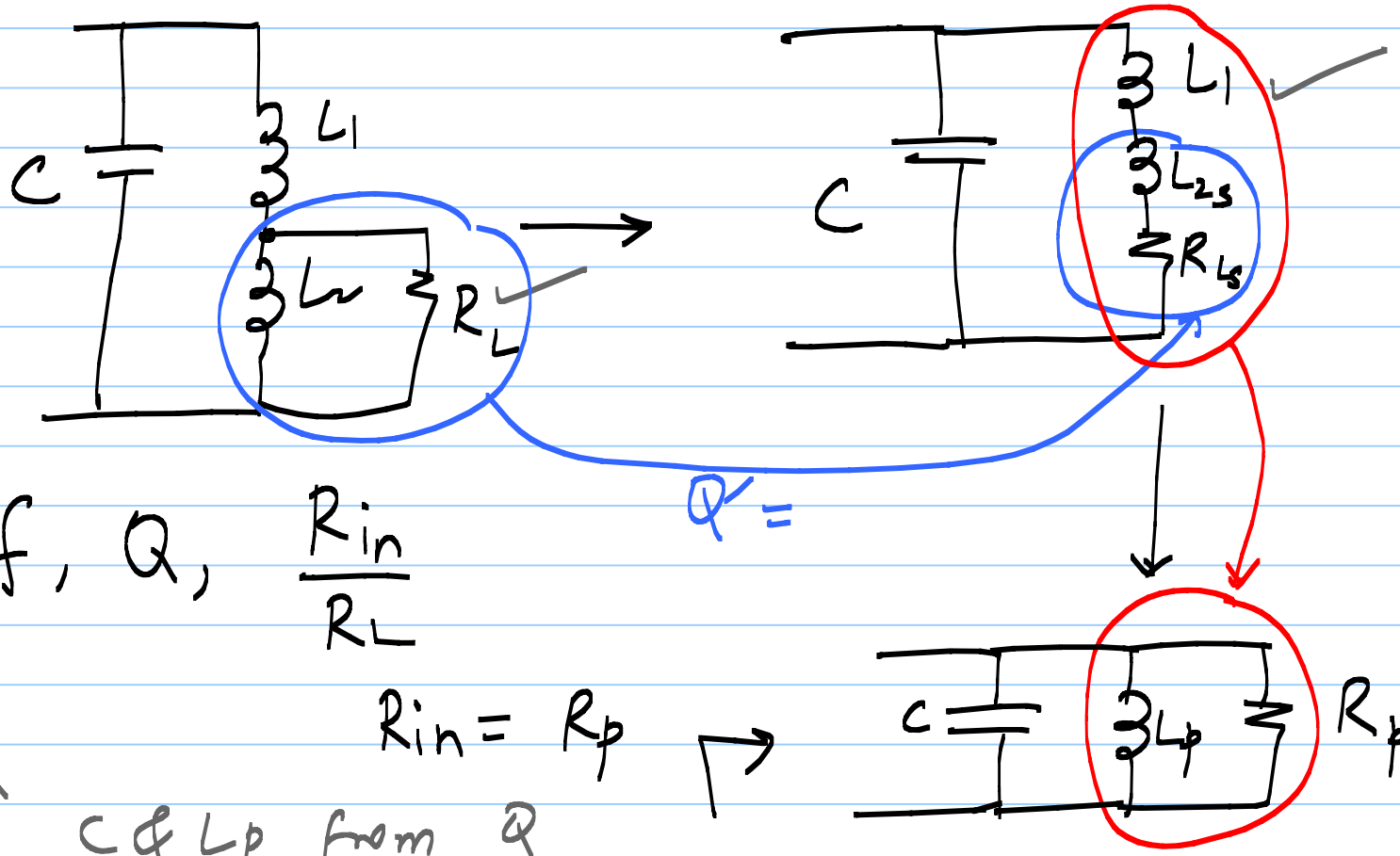
Tapped inductor match

{ Tapped C match }





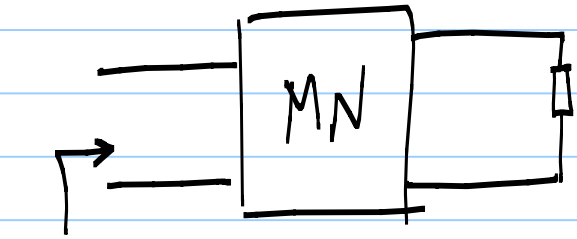




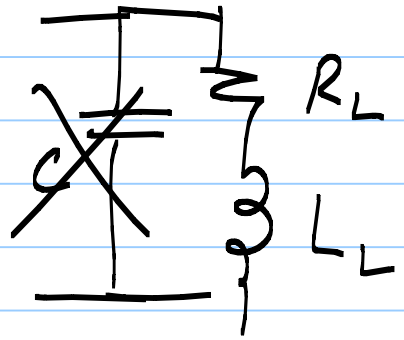
We Know f, Q, $\frac{R_{in}}{R_L}$

$R_{in} = R_p$

* $R_p = R_{in}$
* find C & Lp from Q
* find $(L_1 + L_{2s})$ & R_{Ls}
* Calculate $Q' = \sqrt{\frac{R_L}{R_{Ls}} - 1}$
* Calculate L_2, L_{2s}, L_1

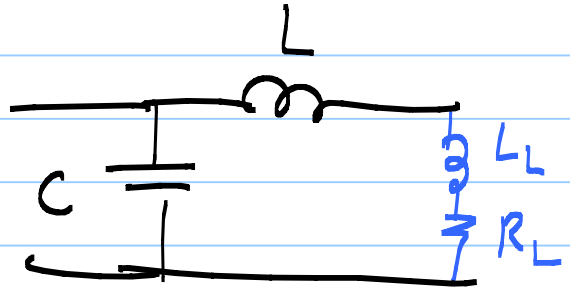


$Z_L = R_L + jX_L$

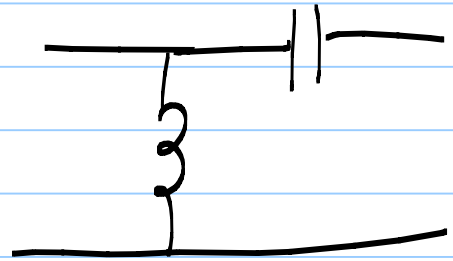


$R_{in} > R_L$

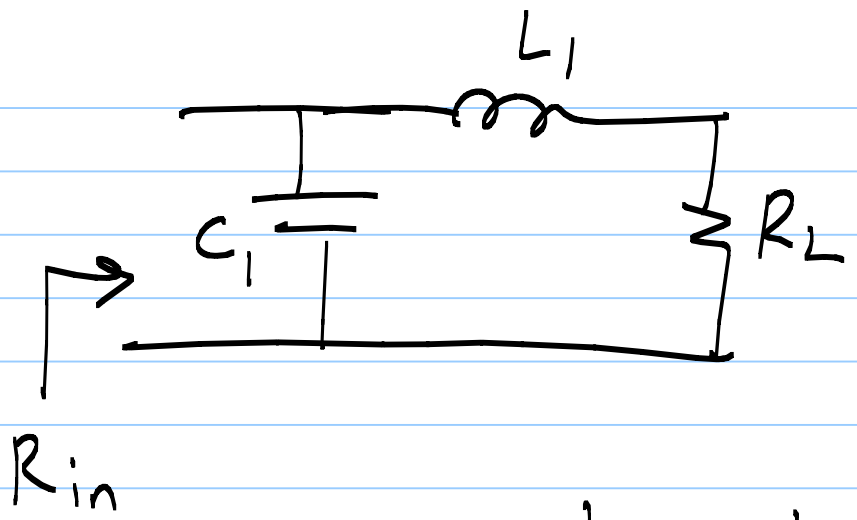
e.g. X_L is positive

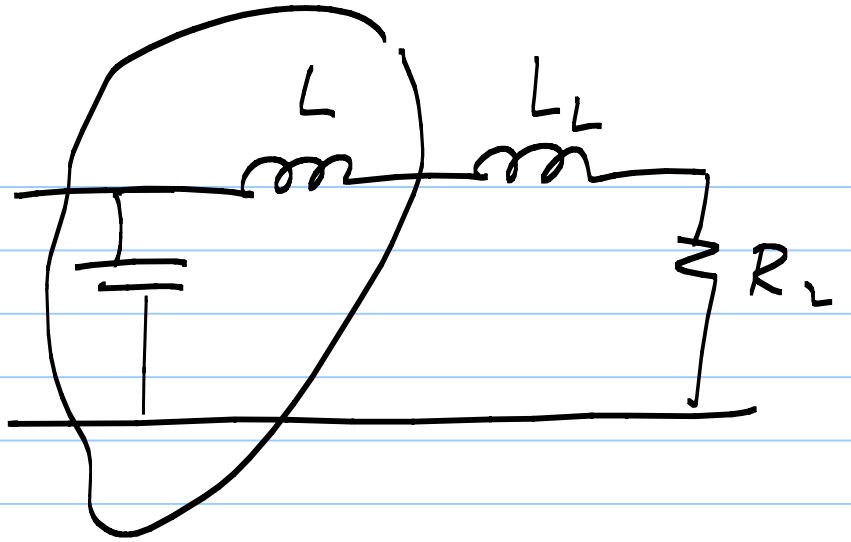


or

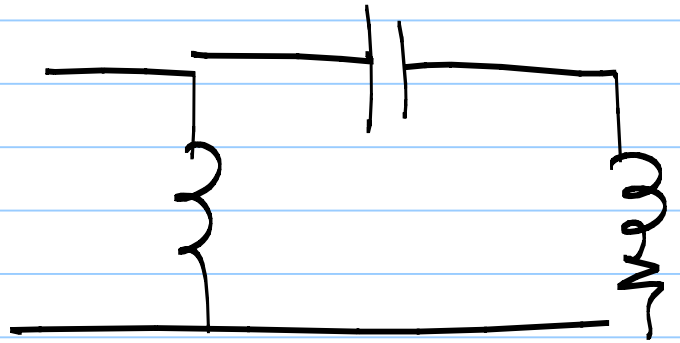


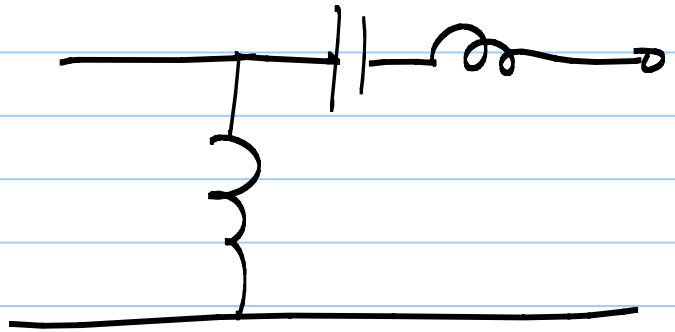
1



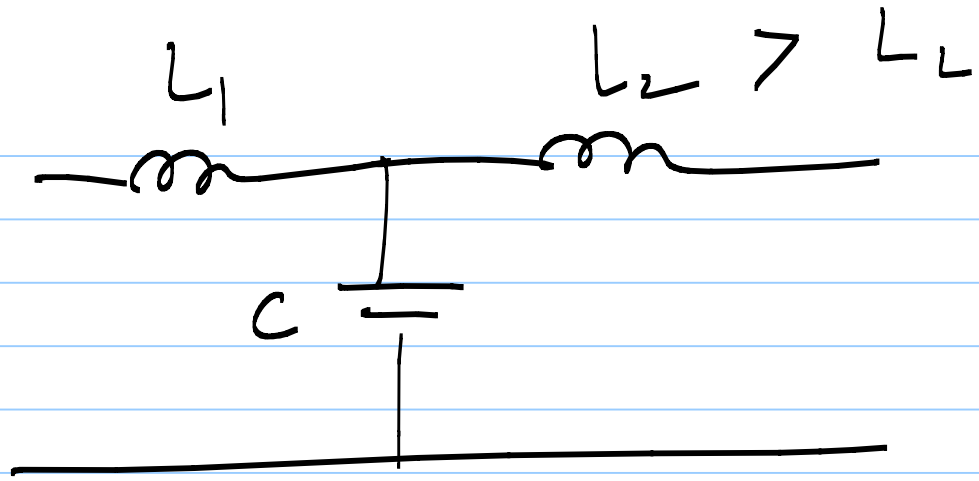


$L_1 > L_L$

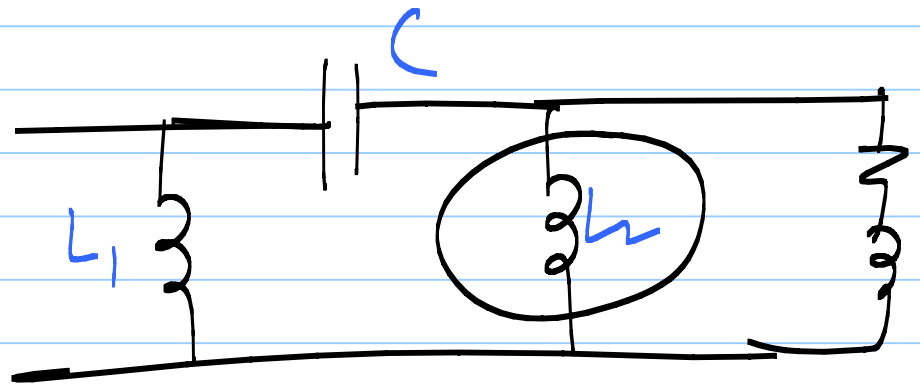


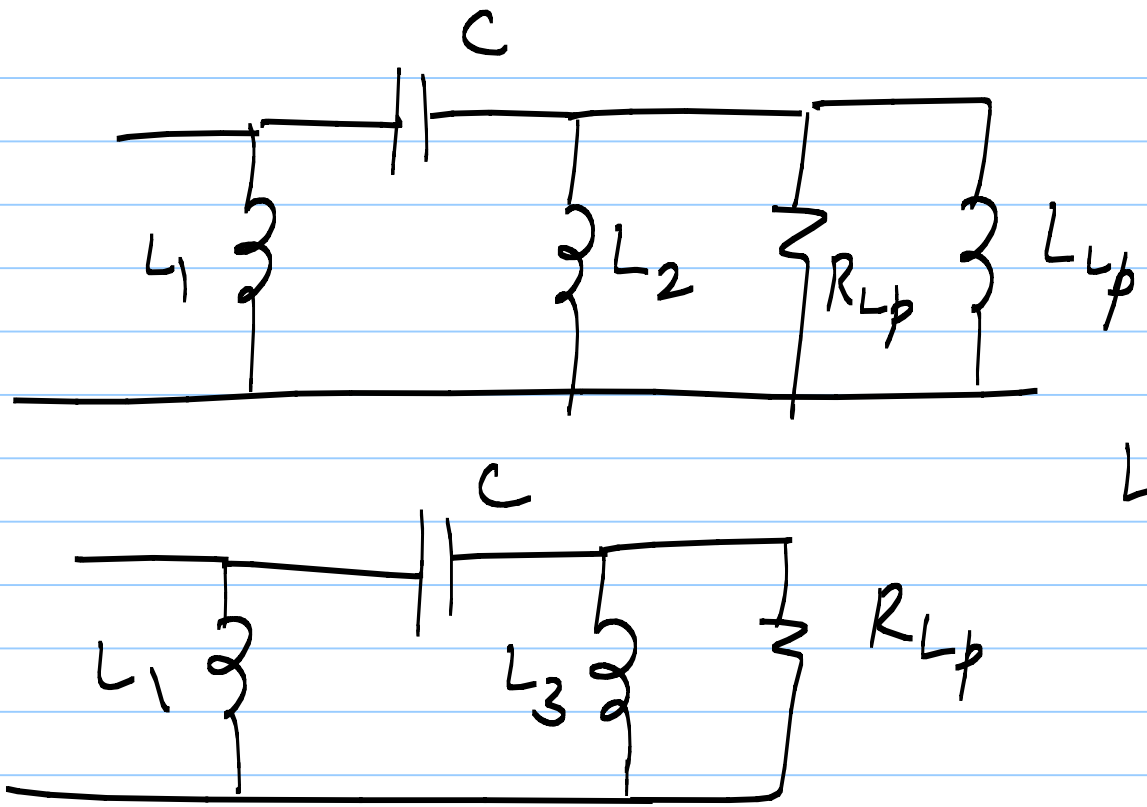


(2)



(3)





$$L_3 = L_2 \| L_{Lp}$$