

# Collection of Impedance Matching Circuits

- ▢ useful functions and identities
- ▢ Units
- ▢ Constants

## Inputs

$$Z_L := 50\text{ohm} + j\cdot 0\text{ohm}$$

$$Z_S := 237\text{ohm} - j\cdot 266\text{ohm}$$

$$f_{\min} := 900\text{MHz}$$

$$f_{\max} := 900\text{MHz}$$

$$Q := 2$$

Load impedance

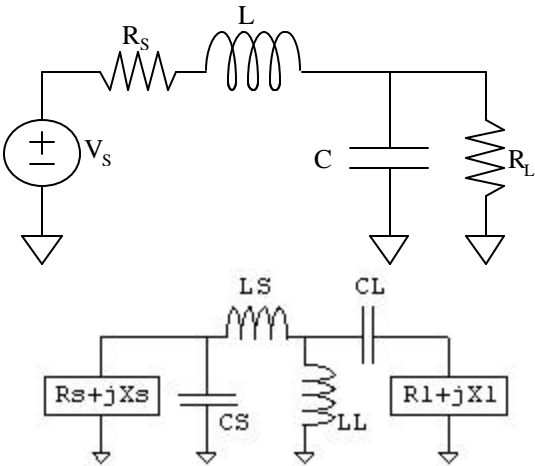
Source impedance

Lower edge of band frequency

Upper edge of band frequency

Desired Q of matching network

- ▢ Calculations



## Lowpass L

$$x := \text{lowL}(Z_L, Z_S, f_{\min}, f_{\max})$$

$$L := x_1 \cdot \text{henry} \quad L = 27.554 \text{ nH}$$

$$C := x_2 \cdot \text{farad} \quad C = 0.658 \text{ pF}$$

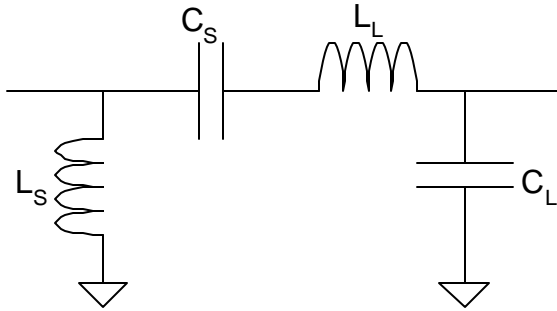
## Bandpass L-L # 2

$$x := \text{band2LL}(f, Z_S, Z_L)$$

$$C_S := x_1 \cdot \text{F} \quad C_S = 0.127 \text{ pF}$$

$$C_L := x_2 \cdot \text{F} \quad C_L = 2.346 \text{ pF}$$

$$L_S := x_3 \cdot \text{H} \quad L_S = 43.625 \text{ nH}$$



$$L_L := x_4 \cdot H \quad L_L = 19.195 \text{ nH}$$

## Bandpass L-L (or Pi)

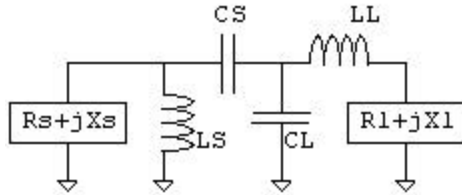
$$x := \text{bandpi}(f, Z_S, Z_L, Q)$$

$$C_S := x_1 \cdot F \quad C_S = 2.439 \text{ pF}$$

$$L_S := x_2 \cdot H \quad L_S = 11.312 \text{ nH}$$

$$C_L := x_3 \cdot F \quad C_L = 7.073 \text{ pF}$$

$$L_L := x_4 \cdot H \quad L_L = 3.537 \text{ nH}$$



## Bandpass L-L #1

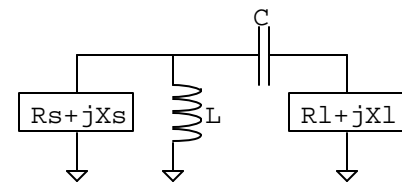
$$x := \text{band1LL}(f, Z_S, Z_L)$$

$$C_S := x_1 \cdot F \quad C_S = 0.717 \text{ pF}$$

$$C_L := x_2 \cdot F \quad C_L = 1.629 \text{ pF}$$

$$L_S := x_3 \cdot H \quad L_S = 36.011 \text{ nH}$$

$$L_L := x_4 \cdot H \quad L_L = 13.33 \text{ nH}$$

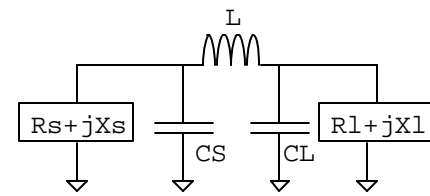


## Highpass L

$$x := \text{highL}(Z_S, Z_L, f)$$

$$L := x_1 \cdot H \quad L = 22.344 \text{ nH}$$

$$C := x_2 \cdot F \quad C = 1.135 \text{ pF}$$



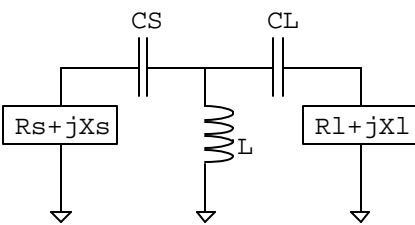
## Lowpass Pi

$$x := \text{lowpi}(f, Z_S, Z_L, Q)$$

$$C_L := x_1 \cdot \text{farad} \quad C_L = 2.583 \text{ i pF}$$

$$C_S := x_2 \cdot \text{farad} \quad C_S = 0.29 \text{ pF}$$

$$L := x_3 \cdot \text{henry} \quad L = 37.882 + 13.83 \text{ i nH}$$



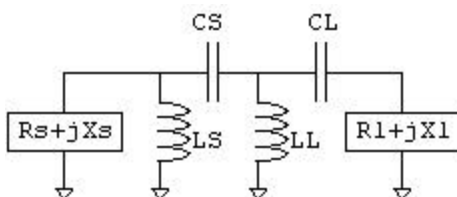
## High Pass T

$$x := \text{hight}(f_{\min}, f_{\max}, Z_S, Z_L, Q)$$

$$C_L := x_1 \cdot \text{farad} \quad C_L = 1.768 \text{ pF}$$

$$C_S := x_2 \cdot \text{farad} \quad C_S = -0.84 \text{ pF}$$

$$L := x_3 \cdot \text{henry} \quad L = 19.788 \text{ nH}$$



## Highpass L-L

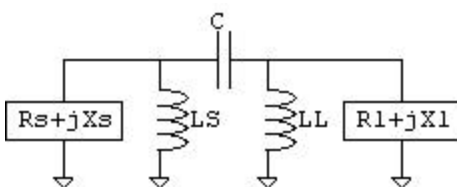
$$x := \text{highLL}(f, Z_S, Z_L)$$

$$C_S := x_1 \cdot F \quad C_S = 0.717 \text{ pF}$$

$$L_S := x_2 \cdot H \quad L_S = 36.011 \text{ nH}$$

$$C_L := x_3 \cdot F \quad C_L = 2.346 \text{ pF}$$

$$L_L := x_4 \cdot H \quad L_L = 19.195 \text{ nH}$$



## Highpass Pi

$$x := \text{highpi}(Z_S, Z_L, Q, f_{\min}, f_{\max})$$

$$L_L := x_1 \cdot H \quad L_L = -12.109 \text{ i nH}$$

$$L_S := x_2 \cdot H \quad L_S = 30.331 \text{ nH}$$

$$C := x_3 \cdot F \quad C = 0.728 - 0.266 \text{ i pF}$$

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