

FIGURES FOR CHAPTER 8

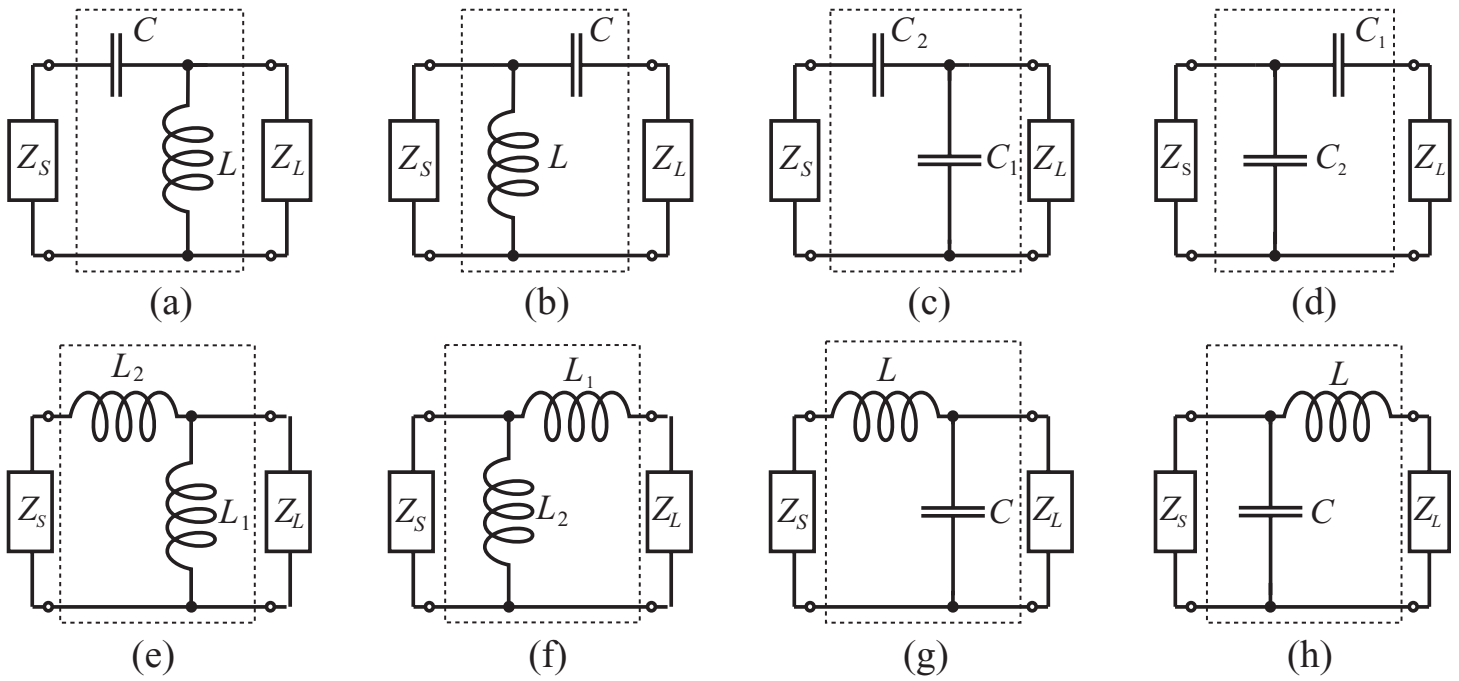


Figure 8-1 Eight possible configurations of the discrete two-component matching networks.

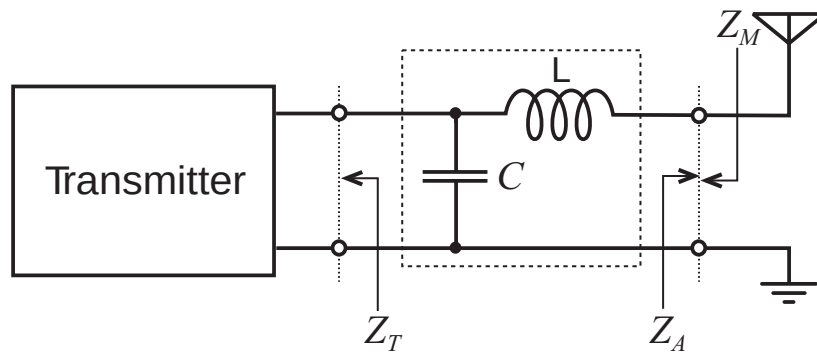


Figure 8-2 Transmitter to antenna matching circuit design.

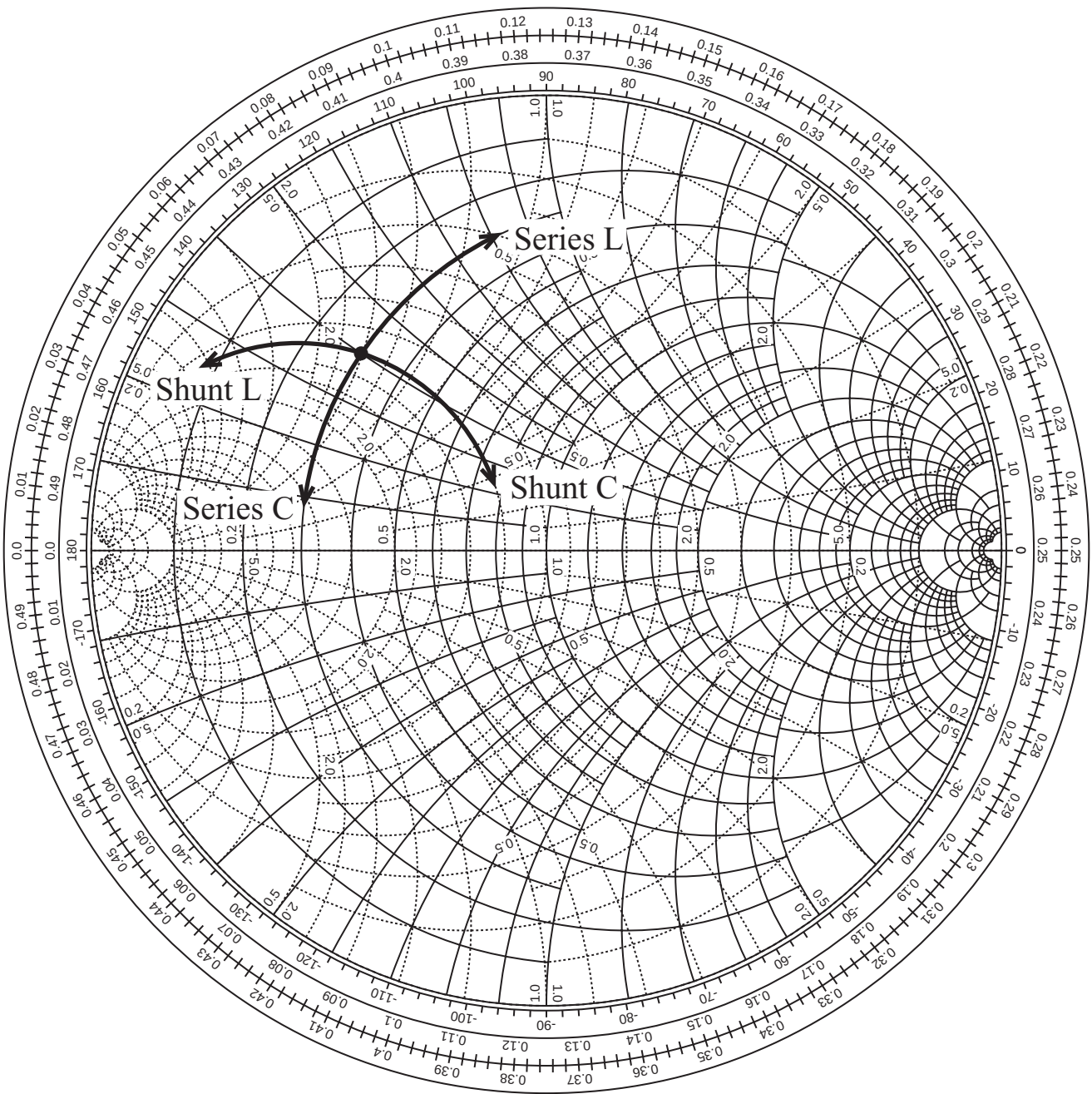


Figure 8-3 Impedance effect of series and shunt connections of L and C to a complex load in the Smith Chart.

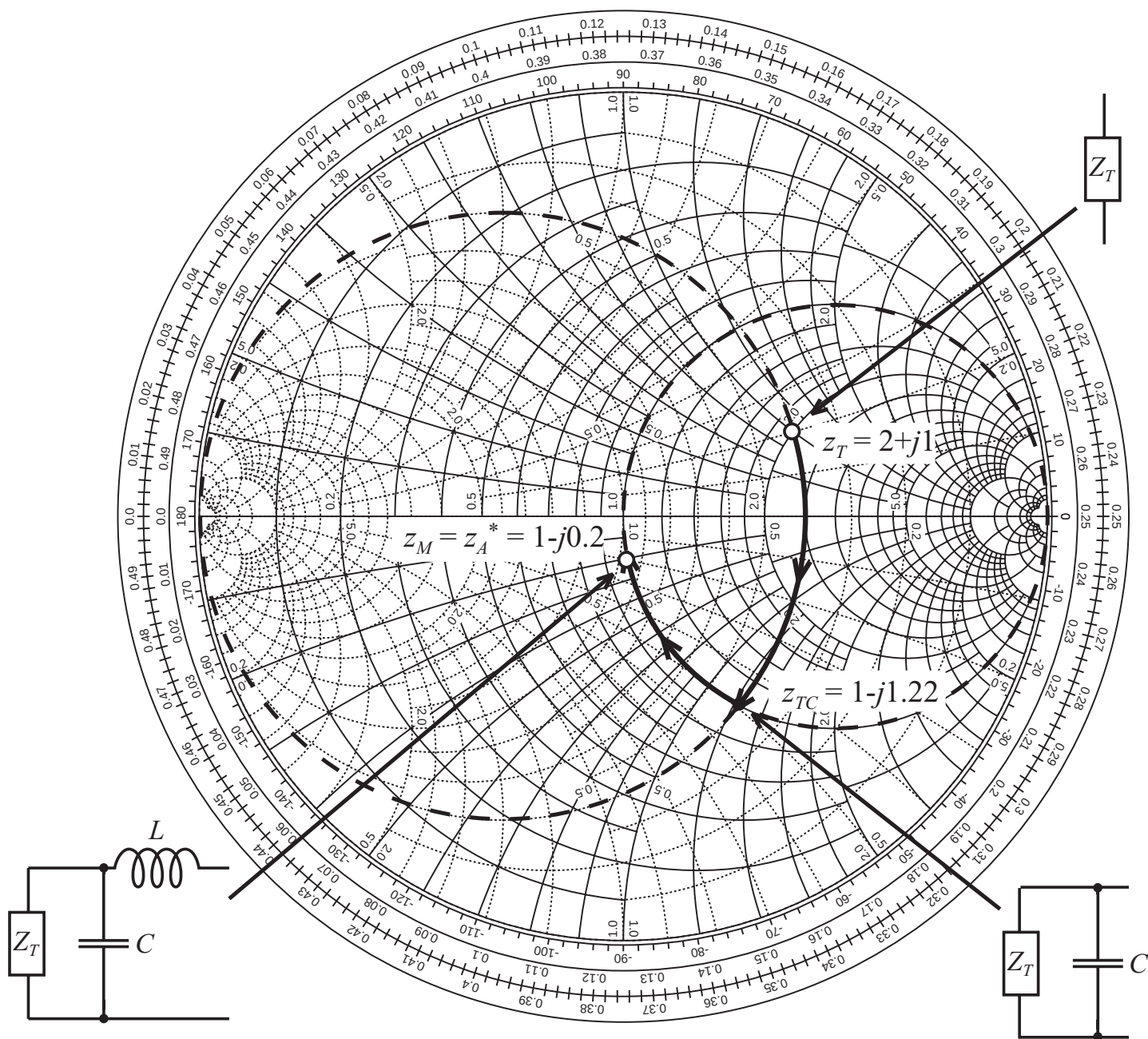


Figure 8-4 Design of the two-element matching network as part of the ZY Smith Chart.

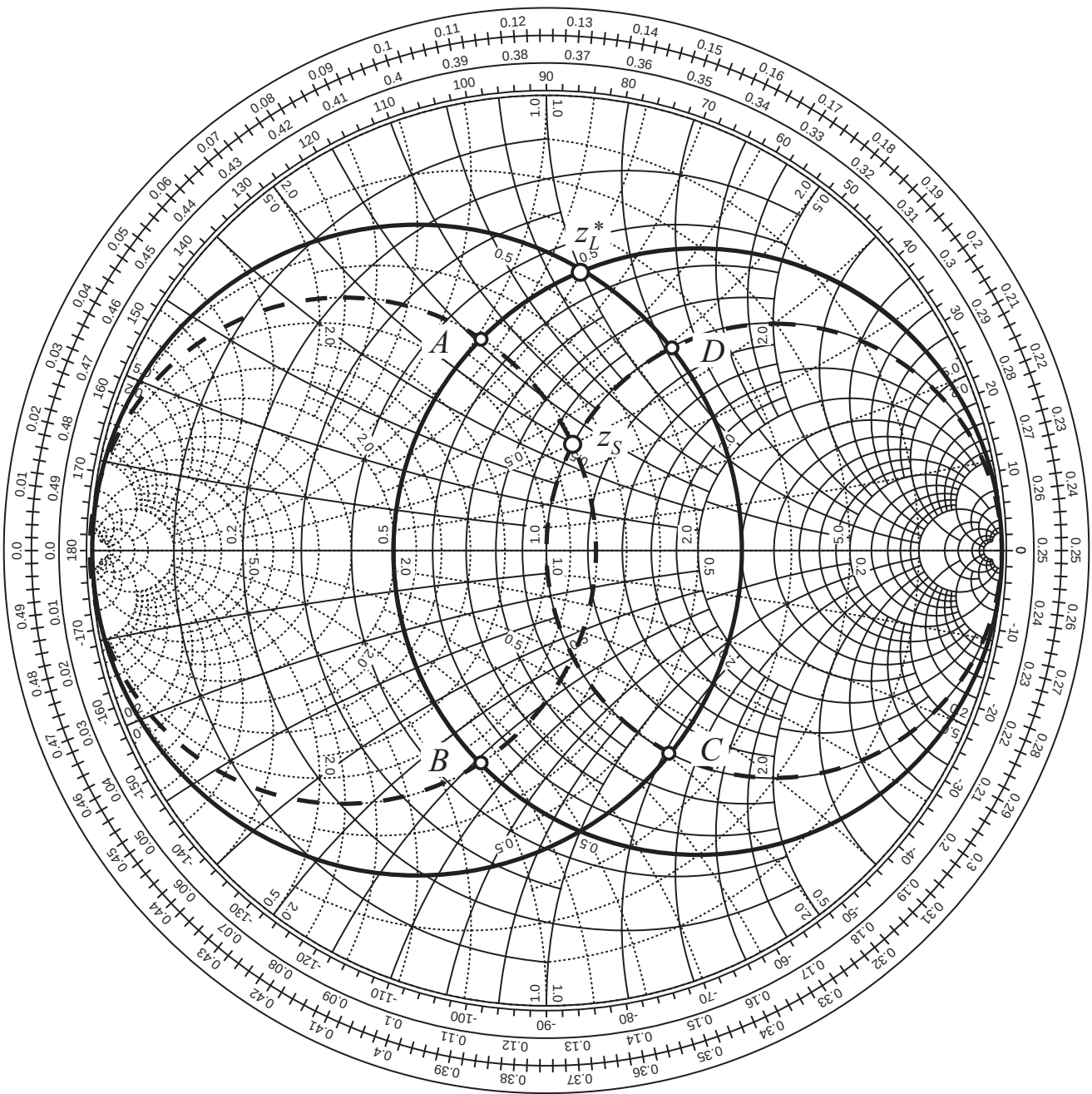


Figure 8-5 Design of a matching network using the Smith Chart

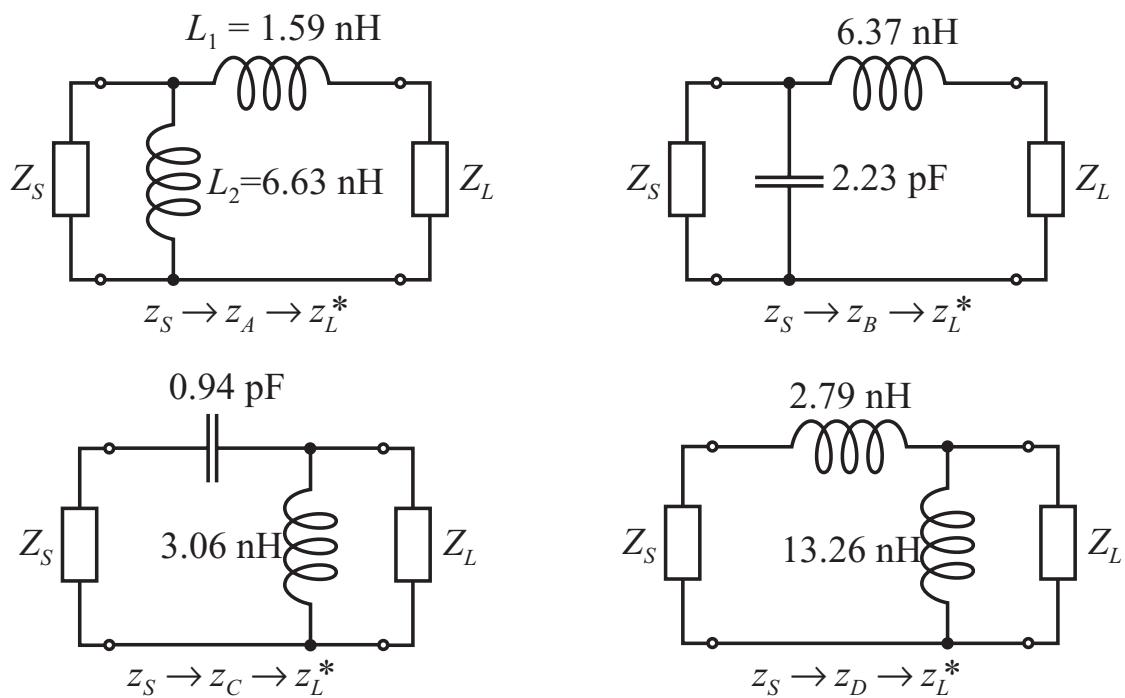


Figure 8-6 Matching networks for four different paths in the Smith Chart.

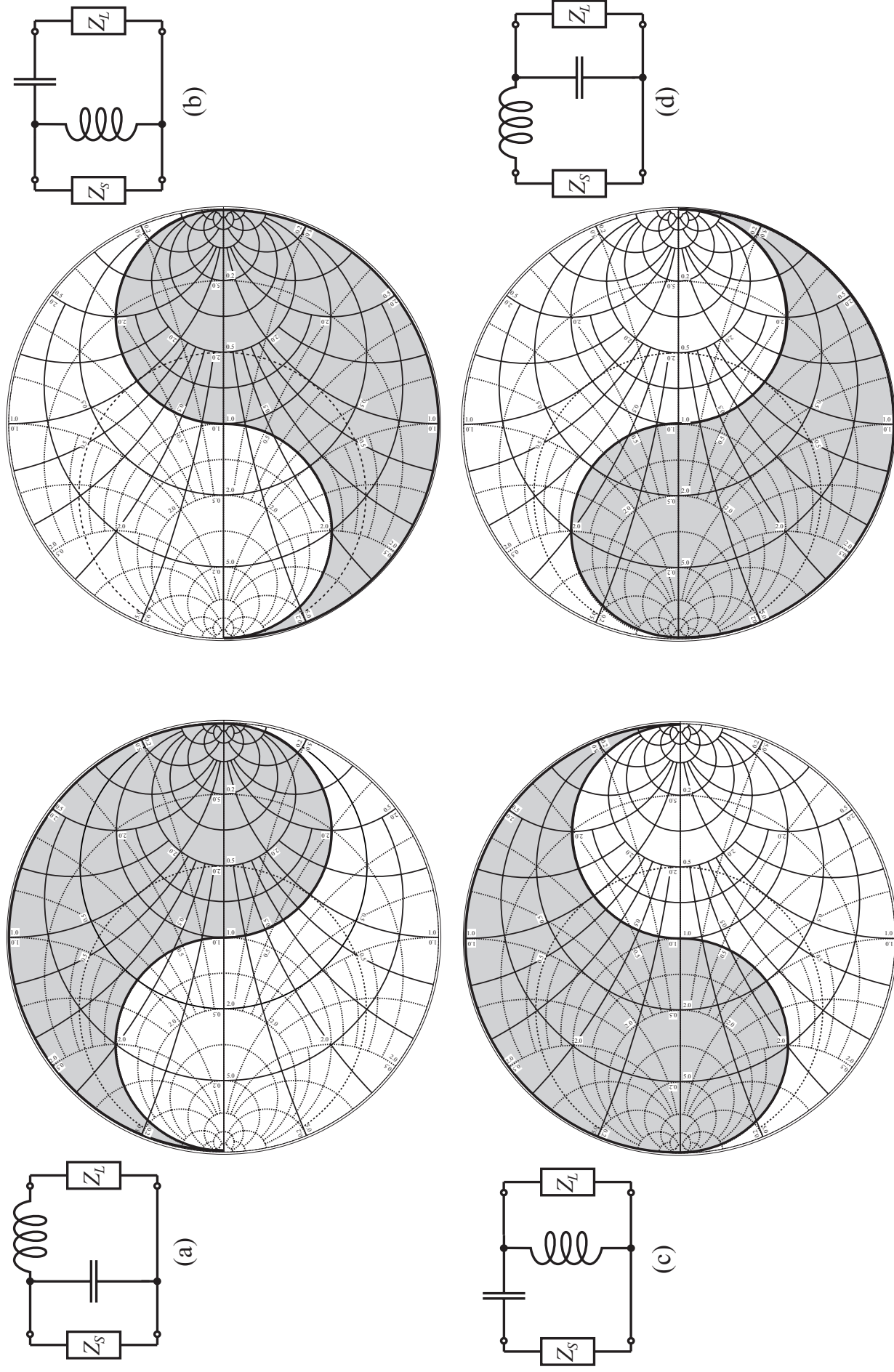
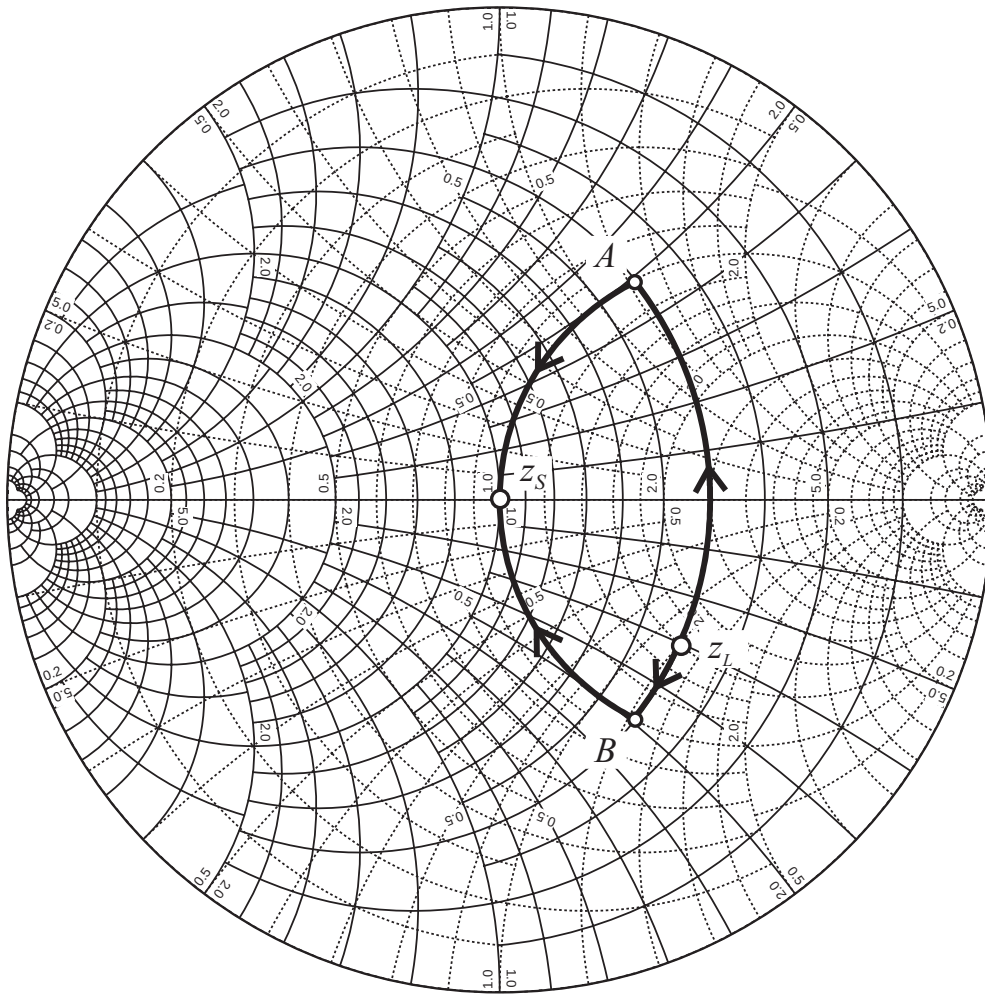
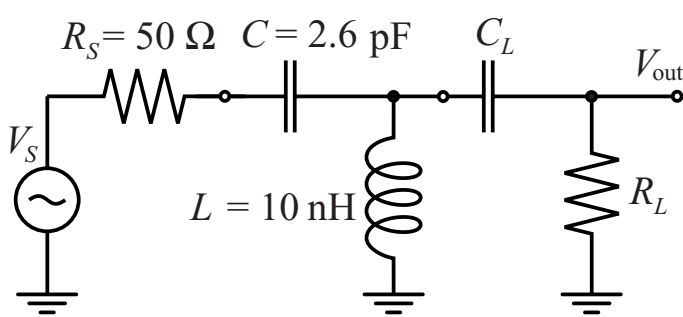


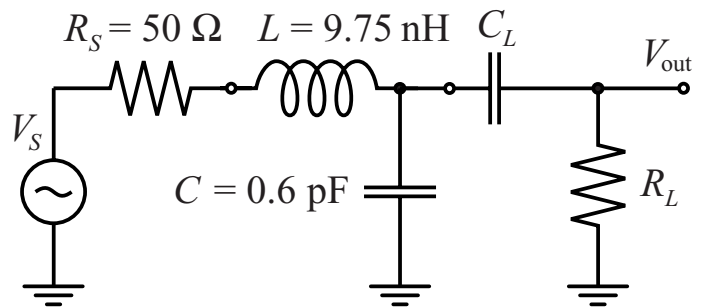
Figure 8-7 Forbidden regions for L-type matching networks with $Z_S = Z_0 = 50 \Omega$.



(a) Impedance transformations displayed in Smith Chart



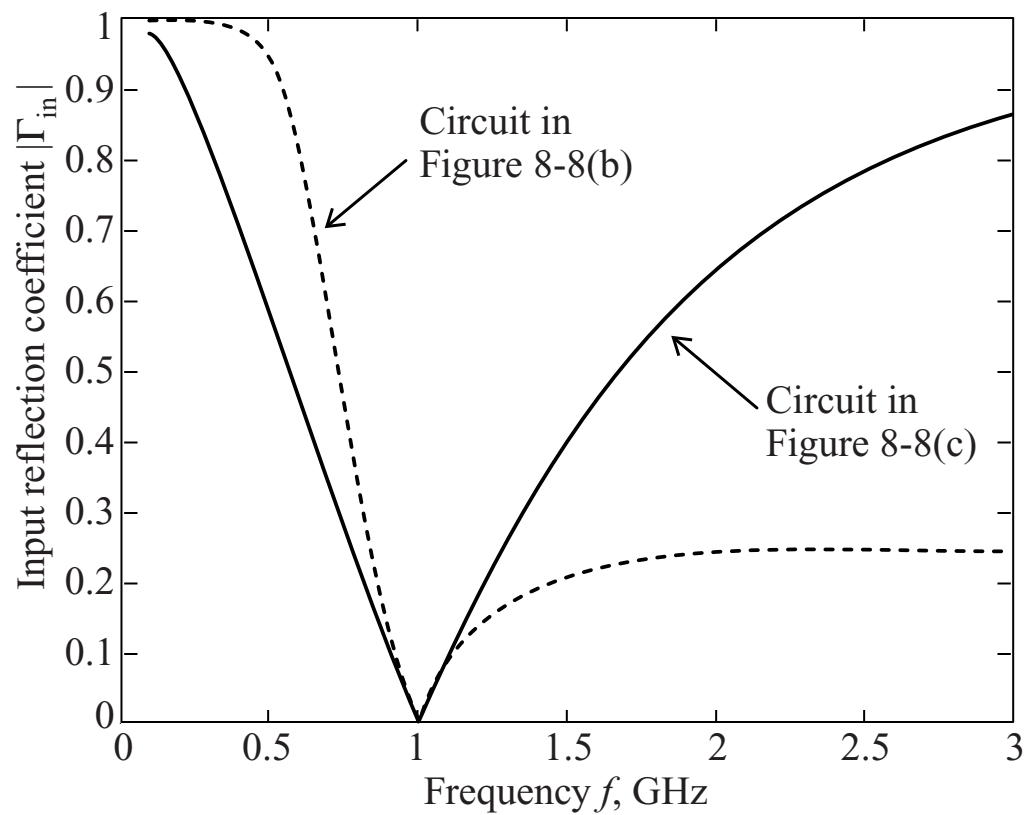
(b)



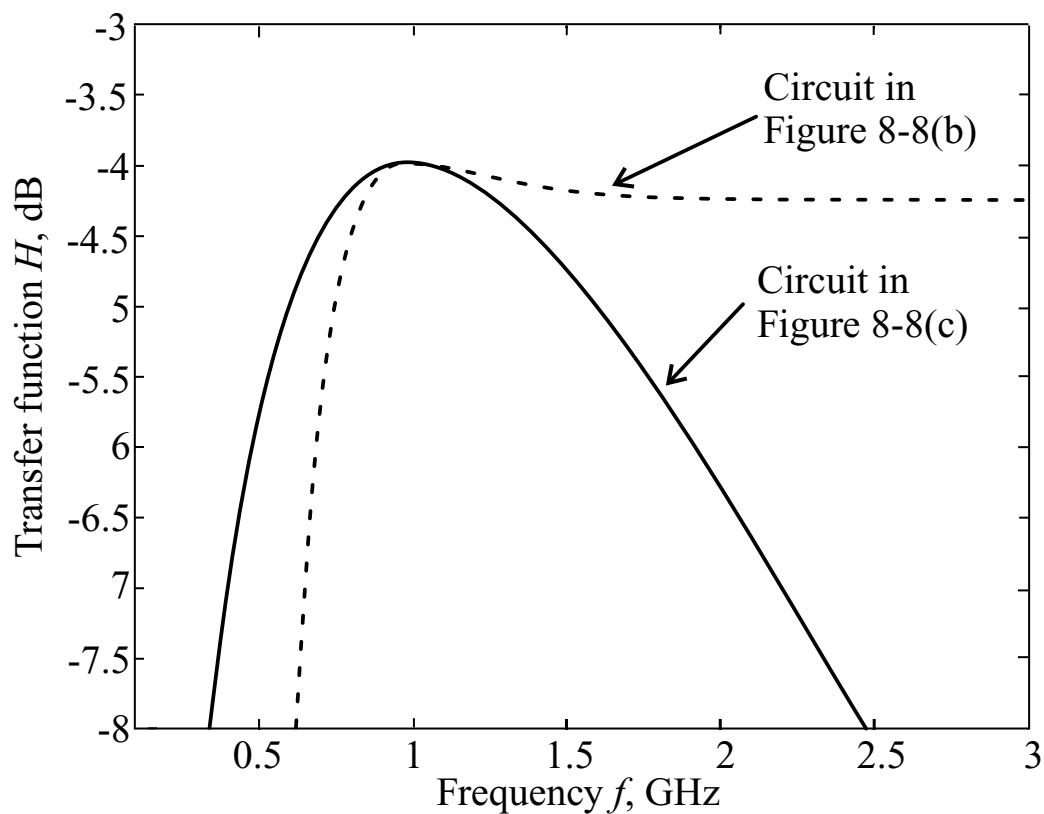
(c)

Resulting matching networks

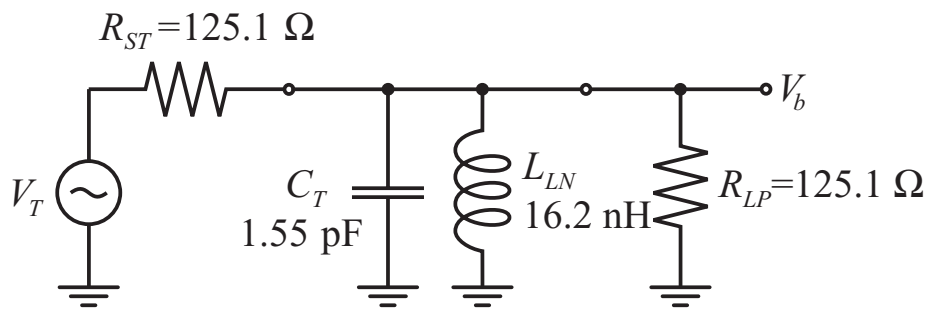
Figure 8-8 Two design realizations of an L-type matching network.



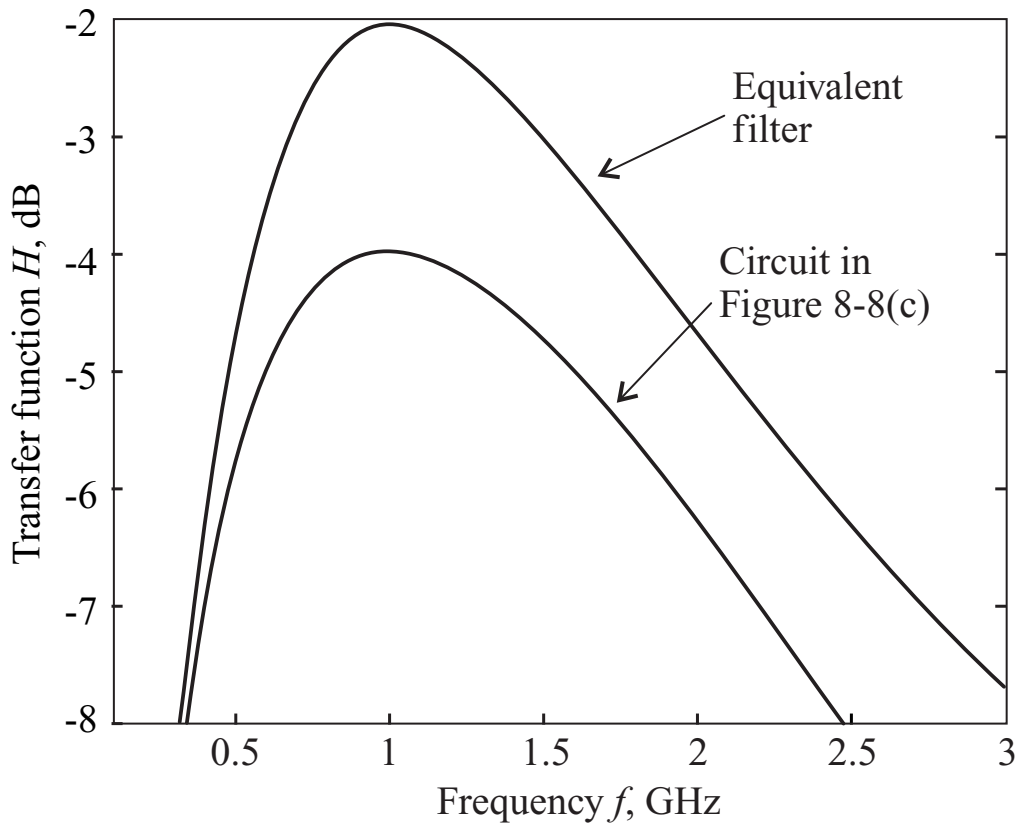
(a) Frequency response of input reflection coefficient



(b) Transfer function of the matching networks



(a) Equivalent bandpass filter



(b) Frequency response of the matching network compared to the equivalent filter response

Figure 8-10 Comparison of the frequency response of the L-type matching network and an equivalent bandpass filter.

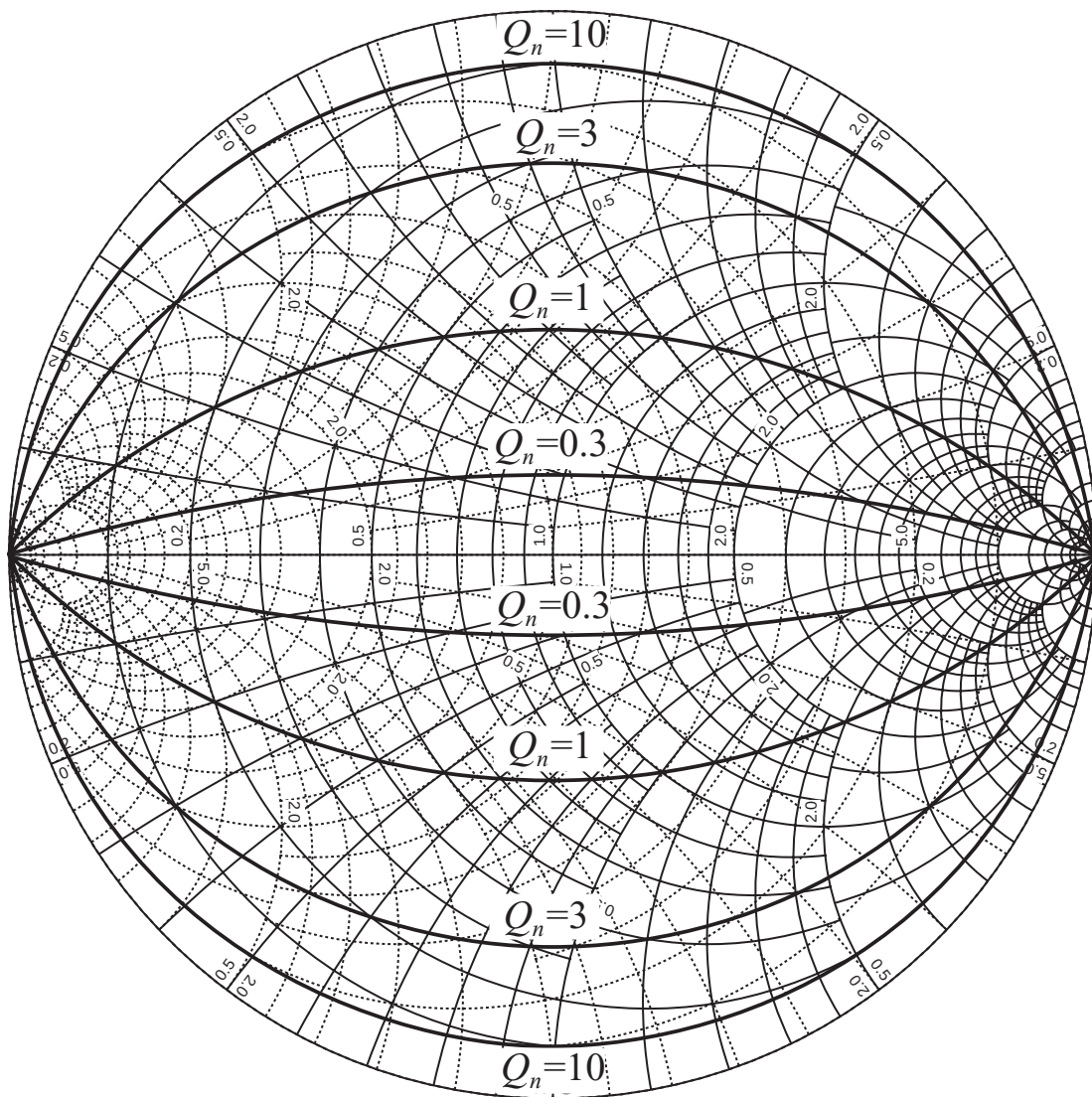
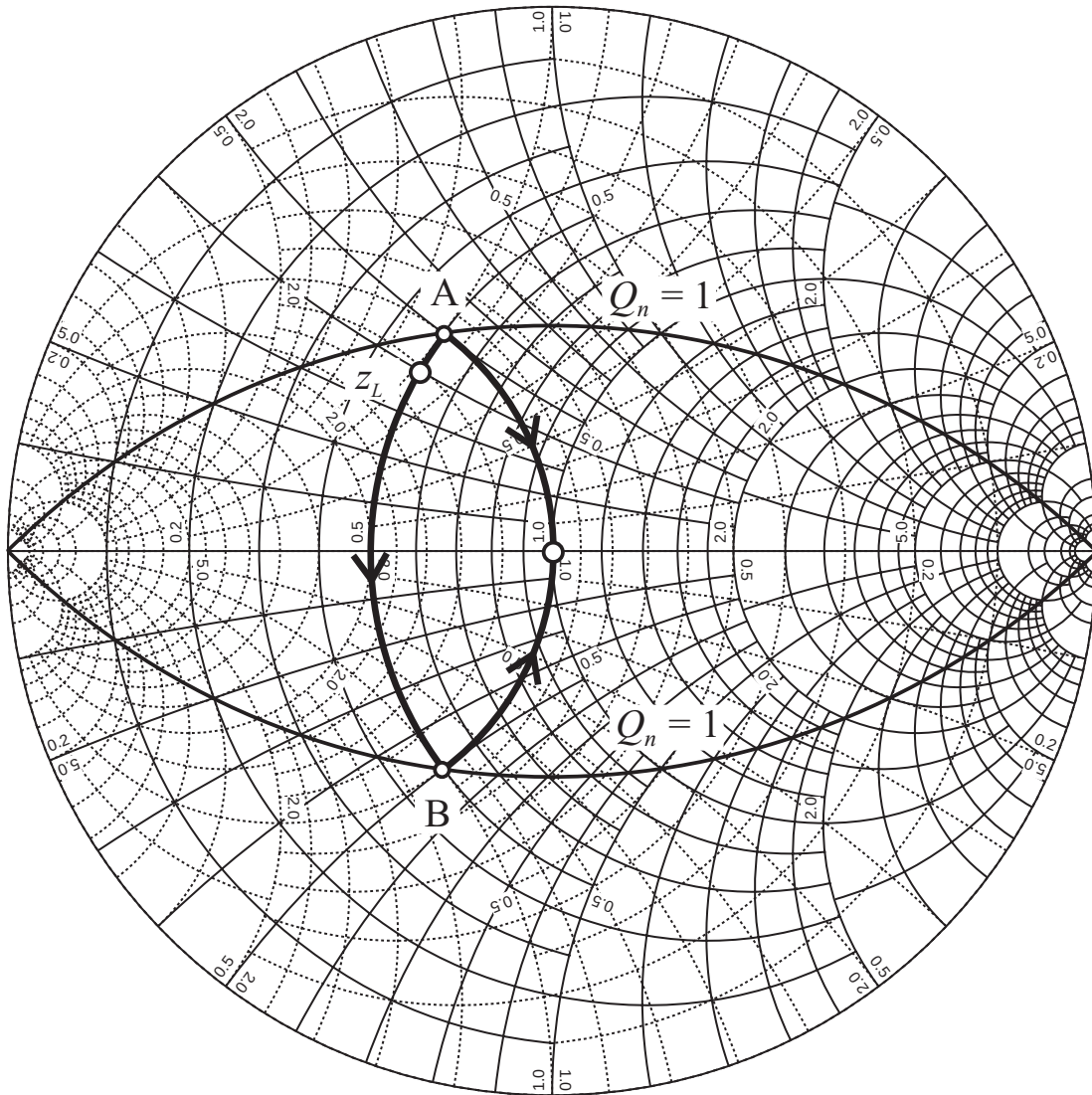
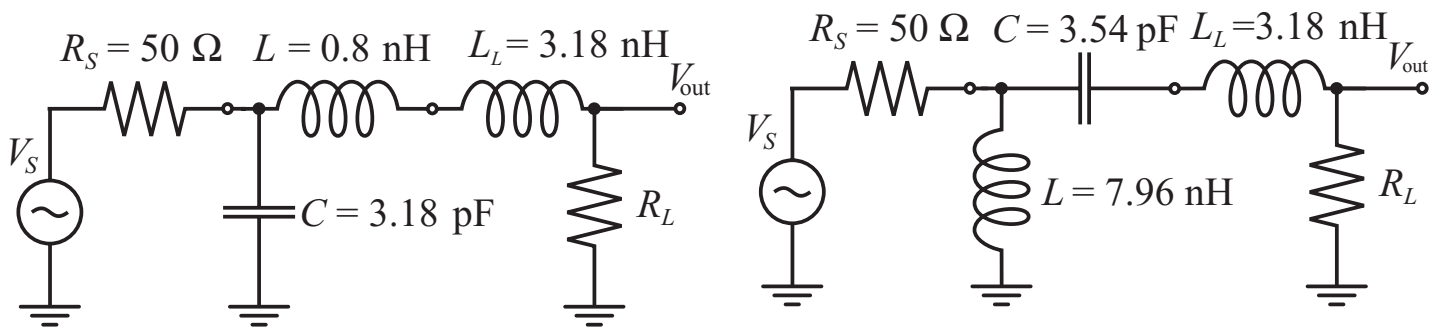


Figure 8-11 Constant Q_n contours displayed in the Smith Chart.



(a) Impedance transformation in the Smith Chart



(b)

(c)

Resulting matching networks

Figure 8-12 Two L-type matching networks for a $50\ \Omega$ source and a $Z_L = (25 + j20)\ \Omega$ load impedance operated at a frequency of 1 GHz .

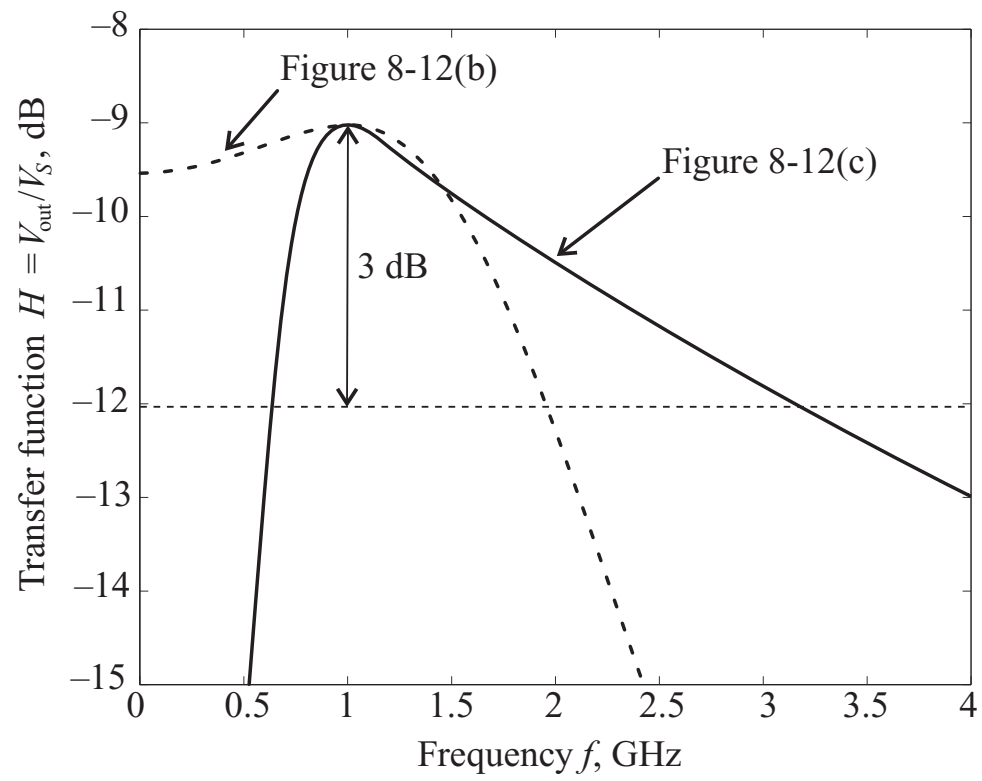


Figure 8-13 Frequency responses for the two matching networks.

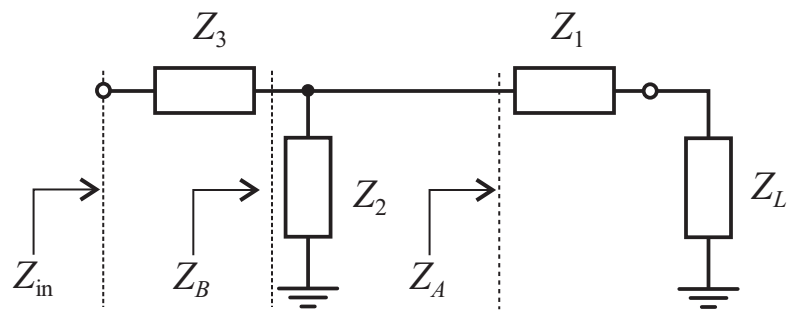


Figure 8-14 General topology of a T-type matching network.

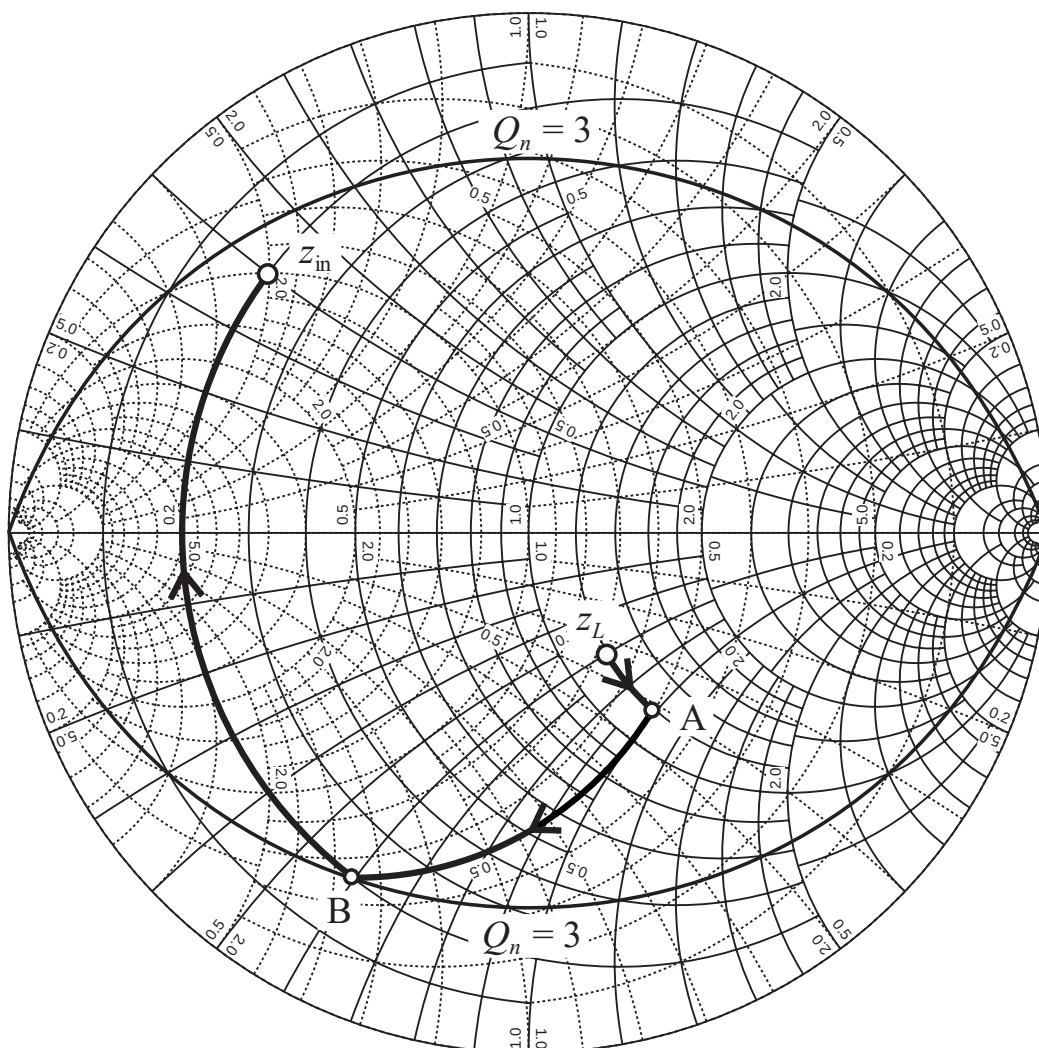


Figure 8-15 Design of a T-type matching network for a specified $Q_n = 3$.

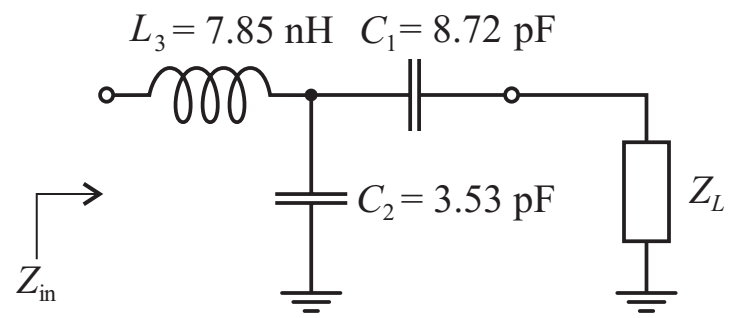


Figure 8-16 T-type matching network circuit schematics.

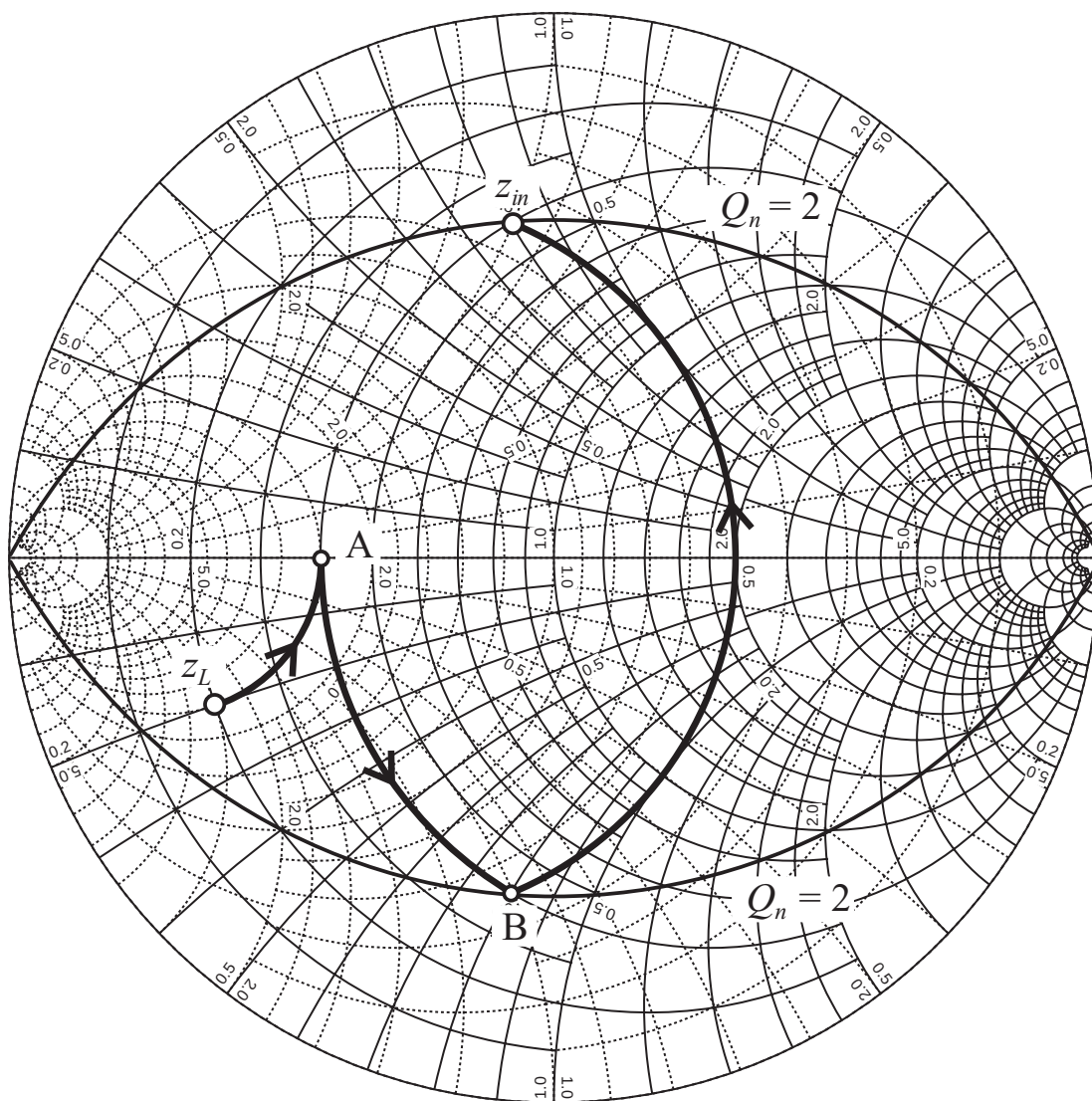


Figure 8-17 Design of a Pi-type matching network using a minimal Q_n .

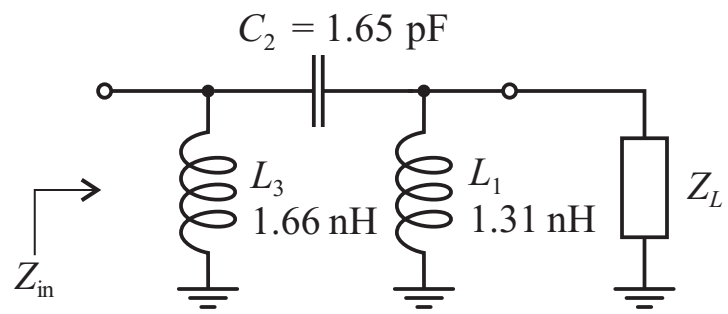


Figure 8-18 Pi-type matching network configuration.

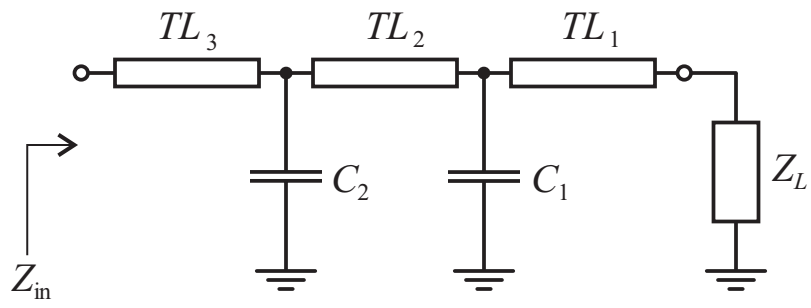


Figure 8-19 Mixed design of matching network involving transmission line sections (TL) and discrete capacitive elements.

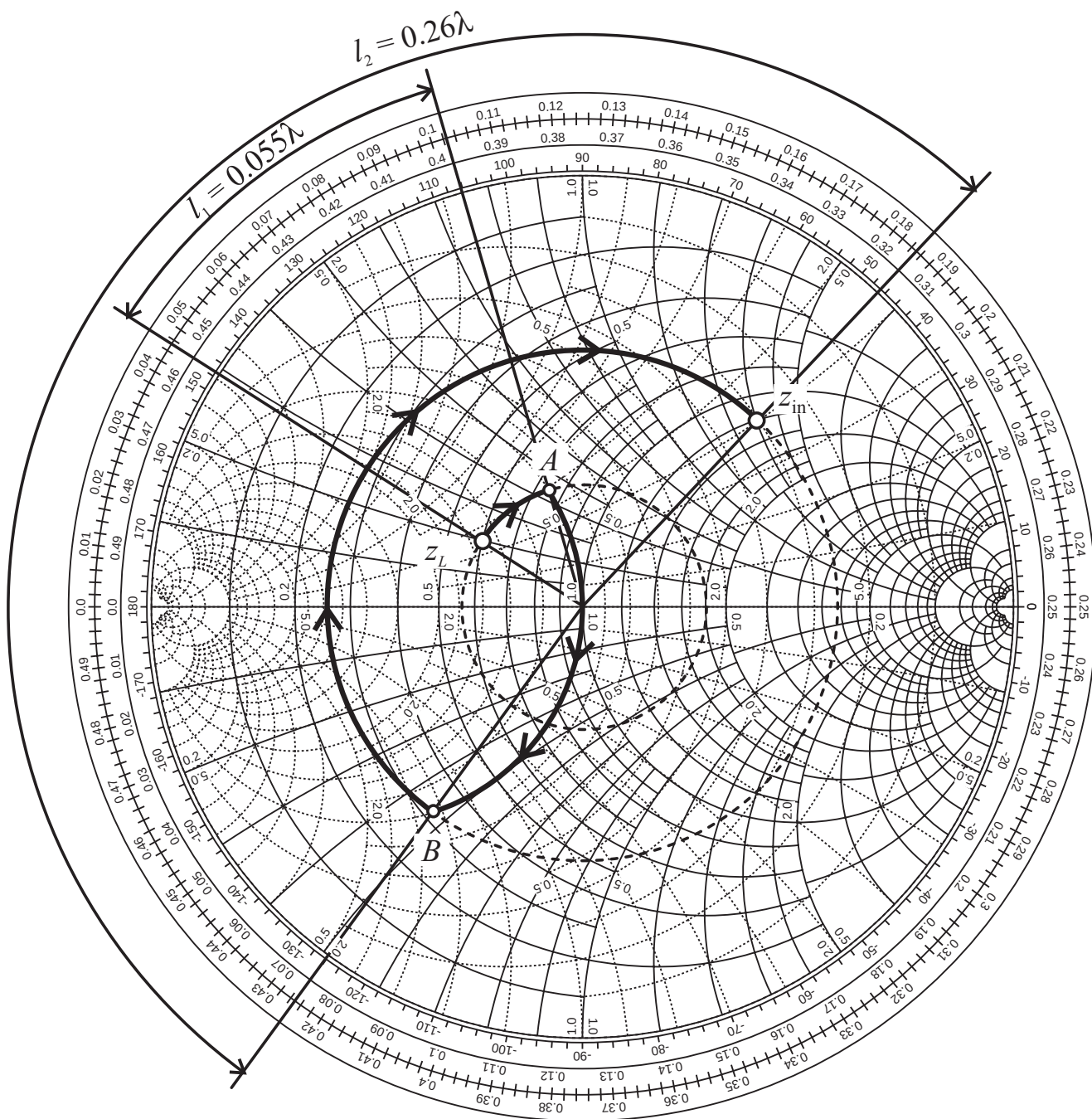


Figure 8-20 Design of the distributed matching network for Example 8-7.

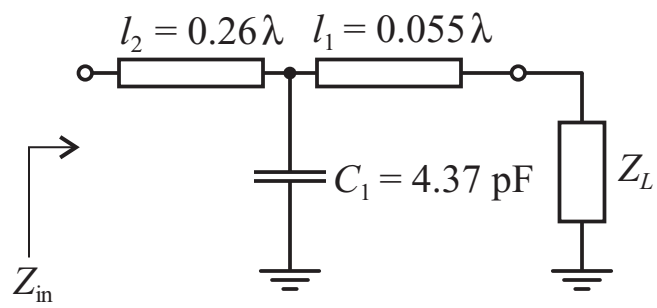


Figure 8-21 Matching network combining series transmission lines and shunt capacitance.

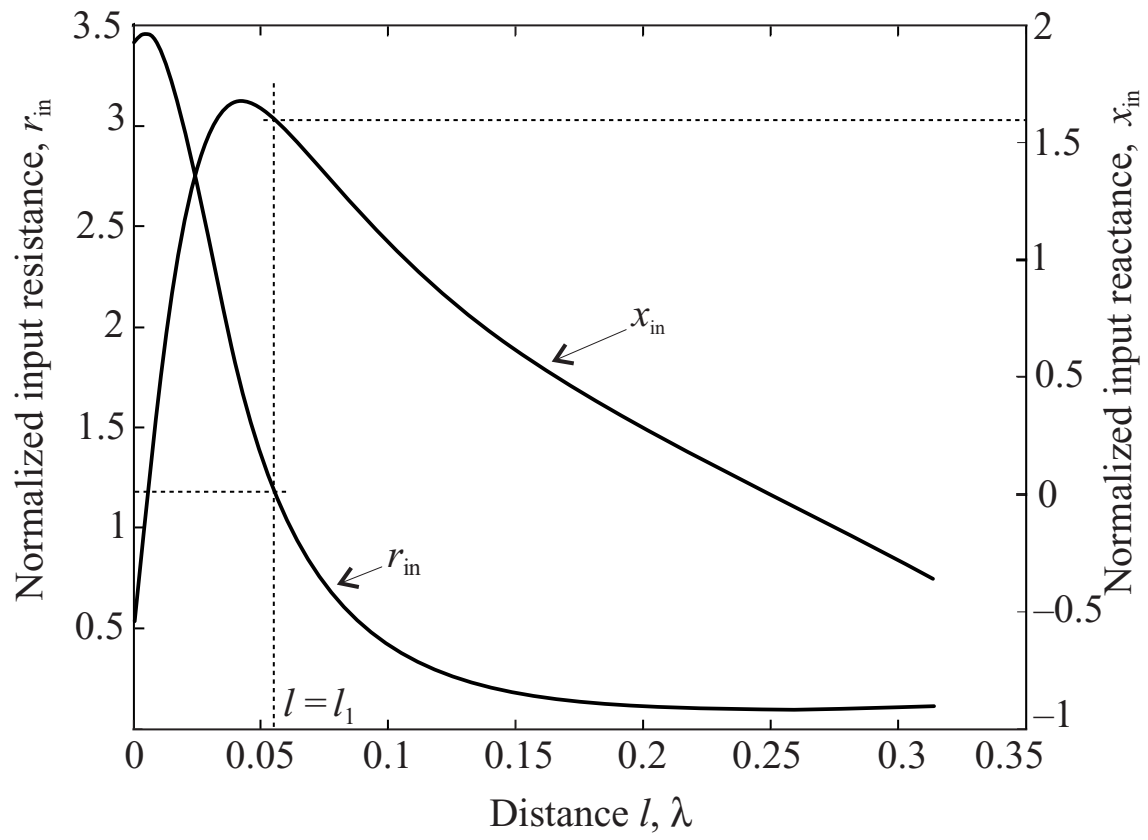


Figure 8-22 Input impedance as a function of the position of the shunt capacitor in Example 8-7.

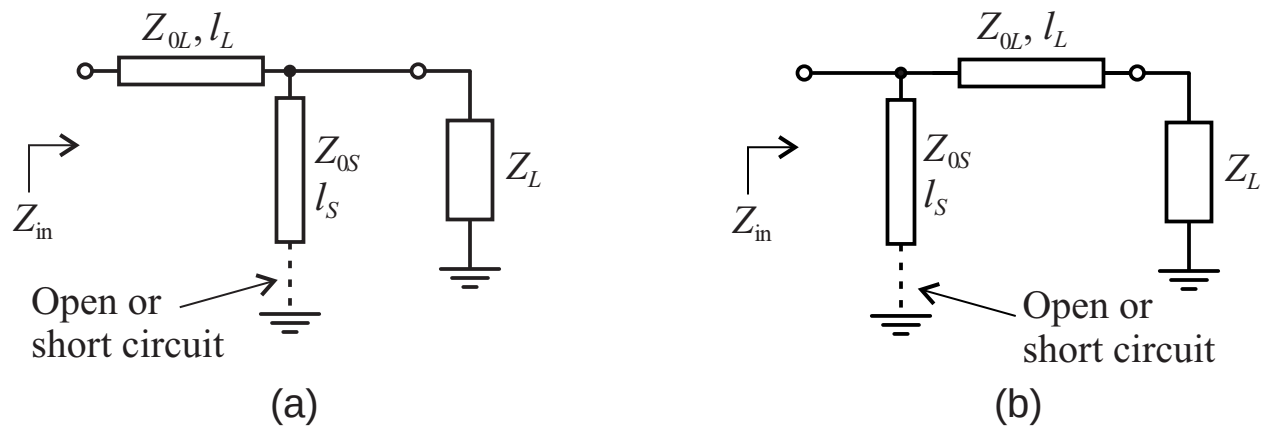


Figure 8-23 Two topologies of single-stub matching networks.

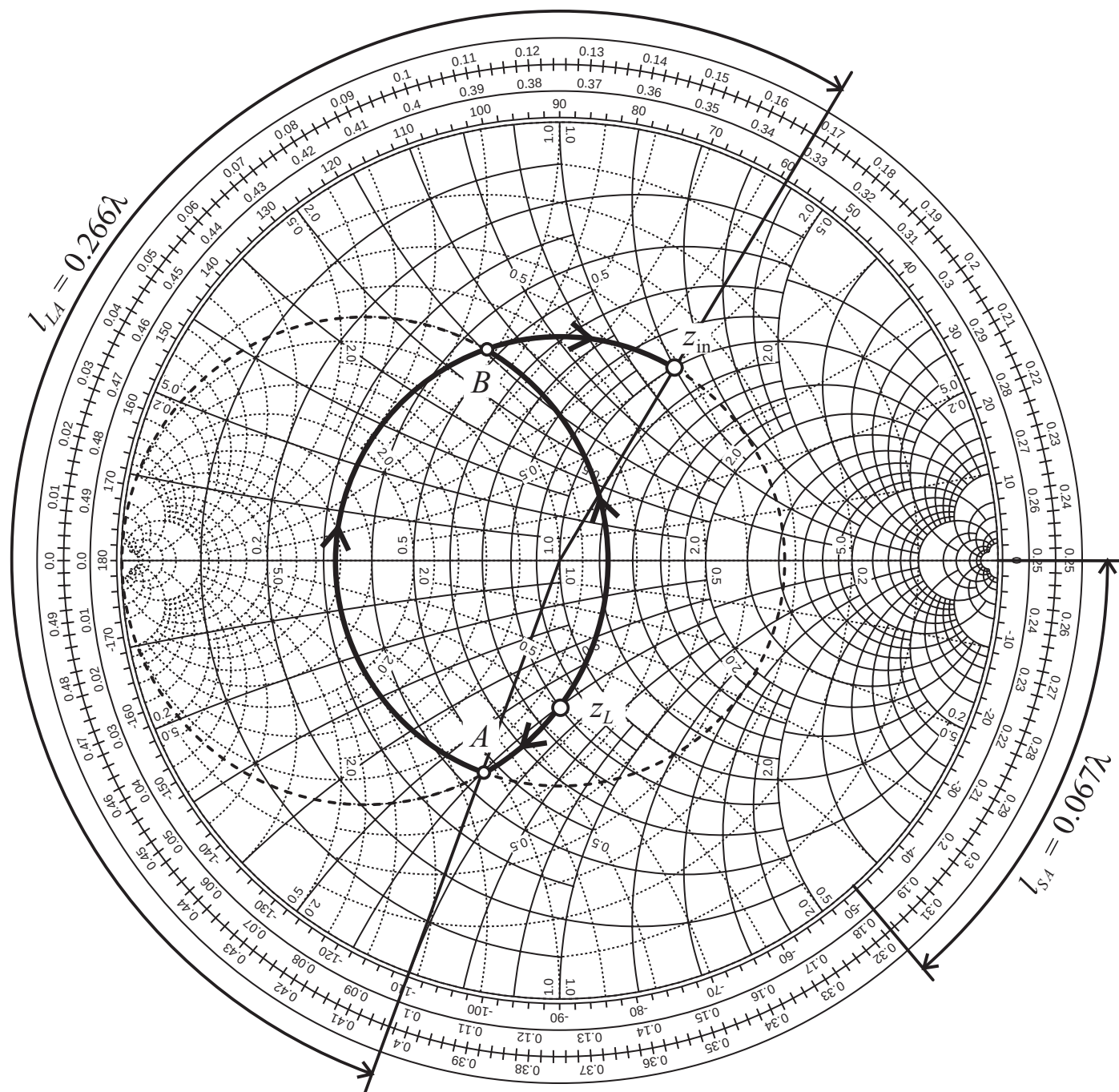


Figure 8-24 Smith Chart design for the single-stub matching network based on Example 8-8.

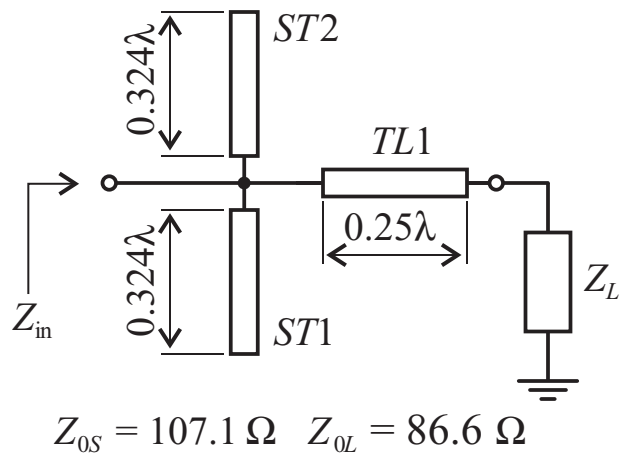


Figure 8-25 Balanced stub design for Example 8-9.

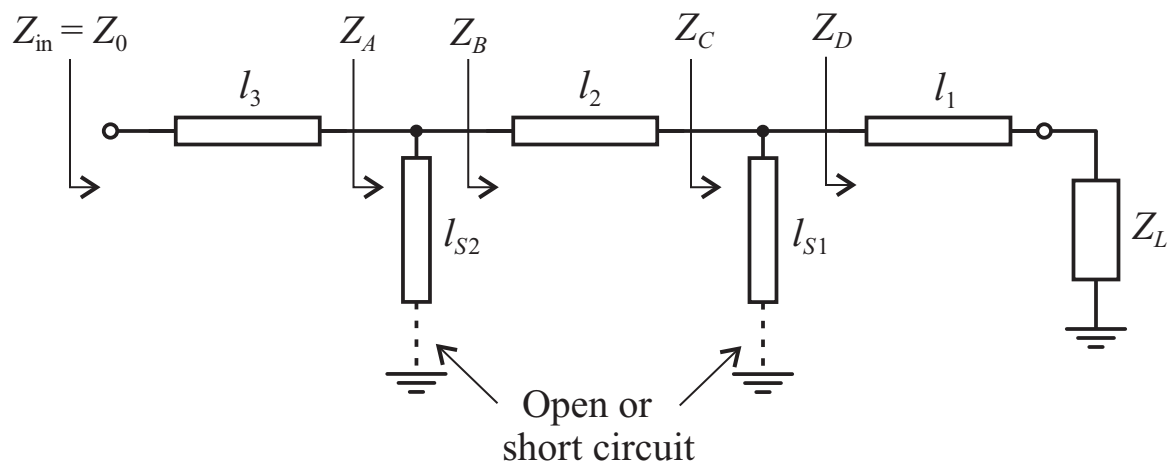


Figure 8-26 Double-stub matching network arrangement.

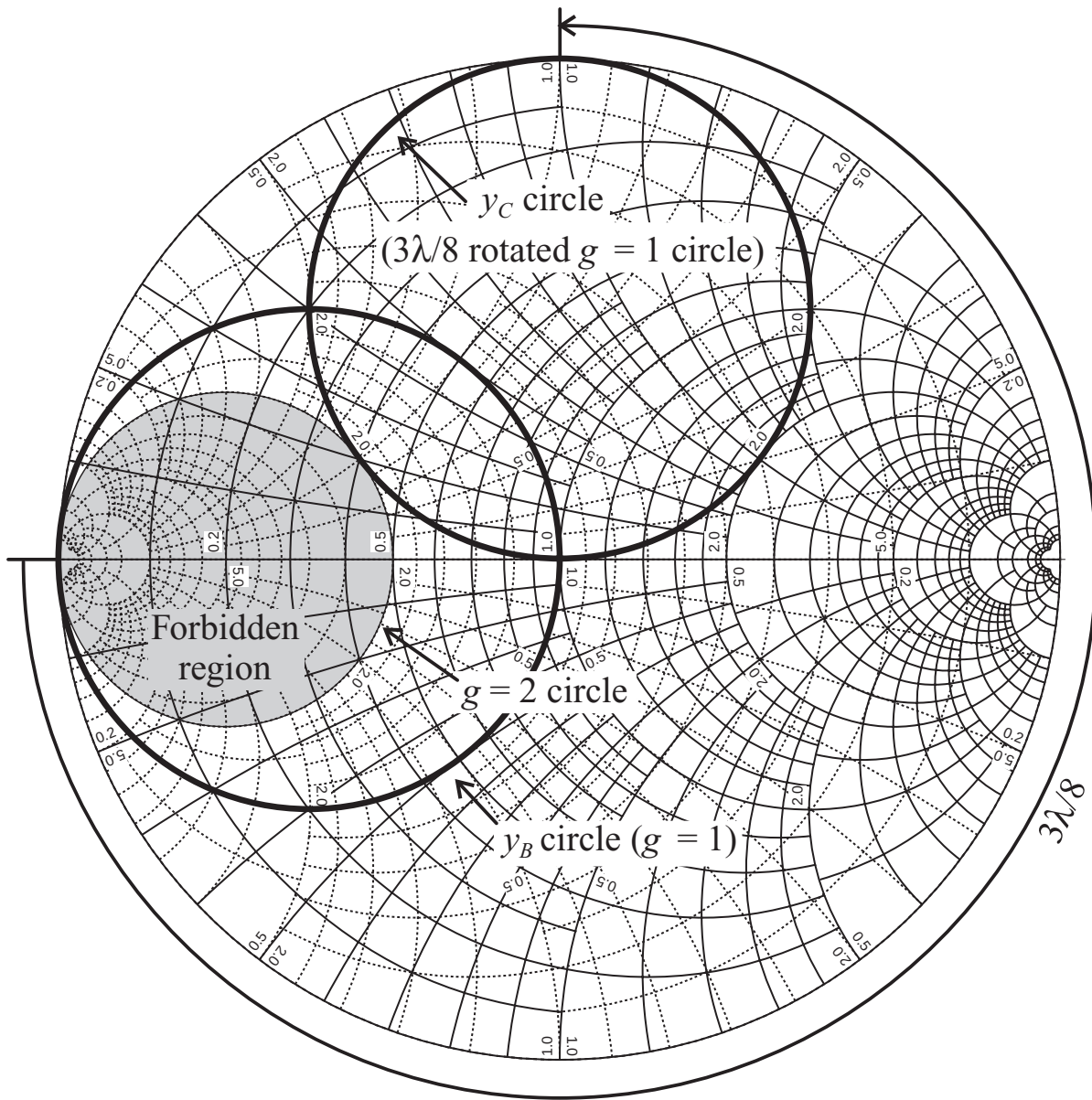


Figure 8-27 Smith Chart analysis of a double-stub matching network shown in Figure 8-26.

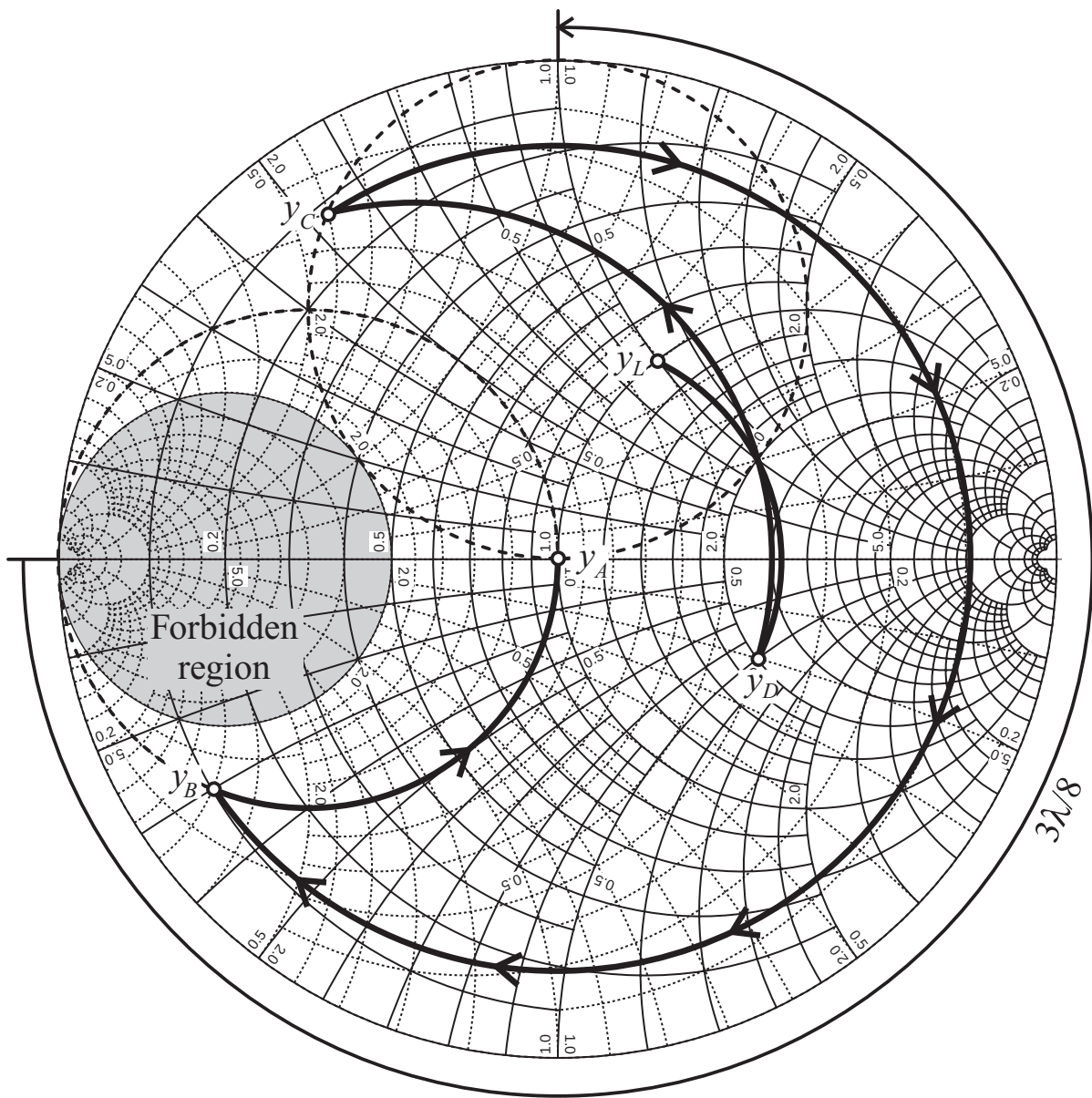
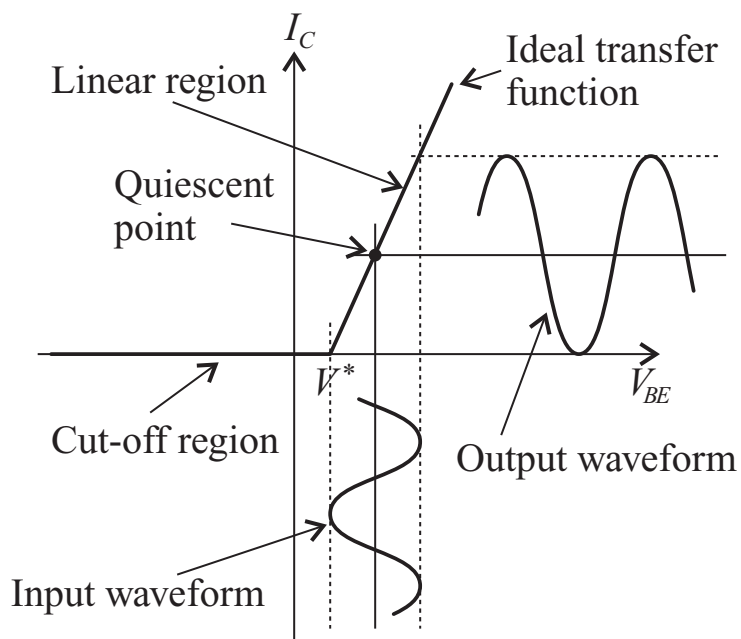
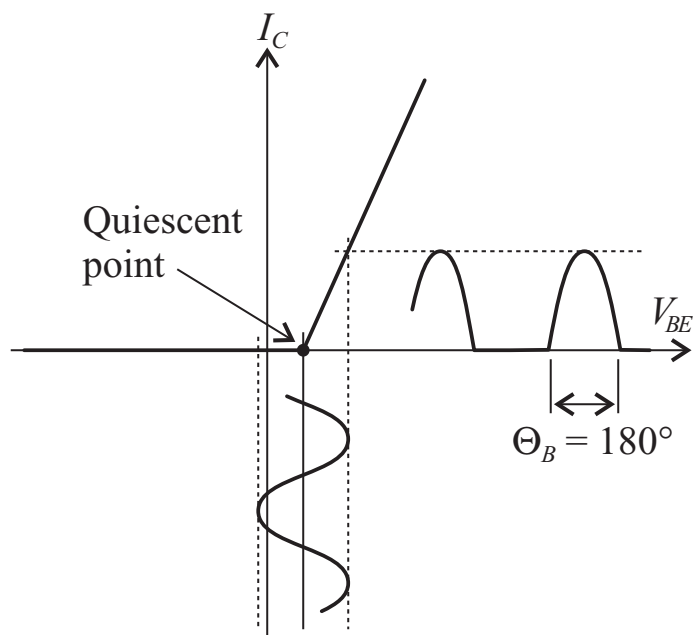


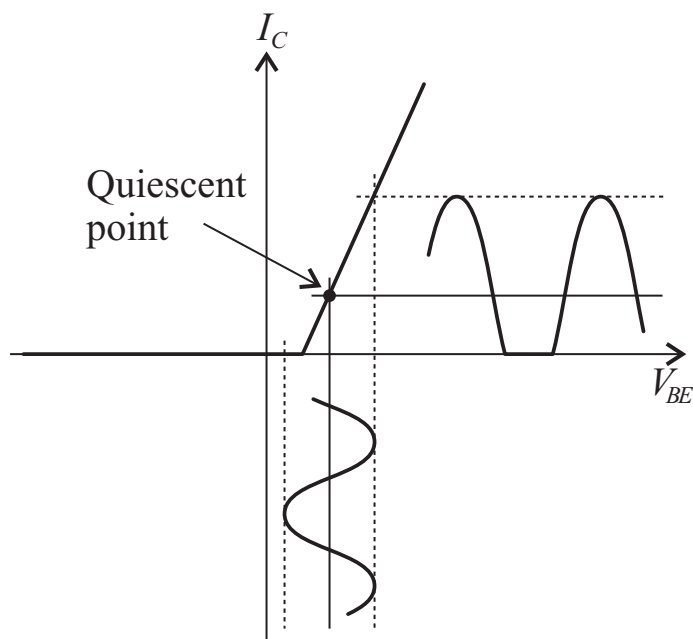
Figure 8-28 Double-stub tuning network design for Example 8-10.



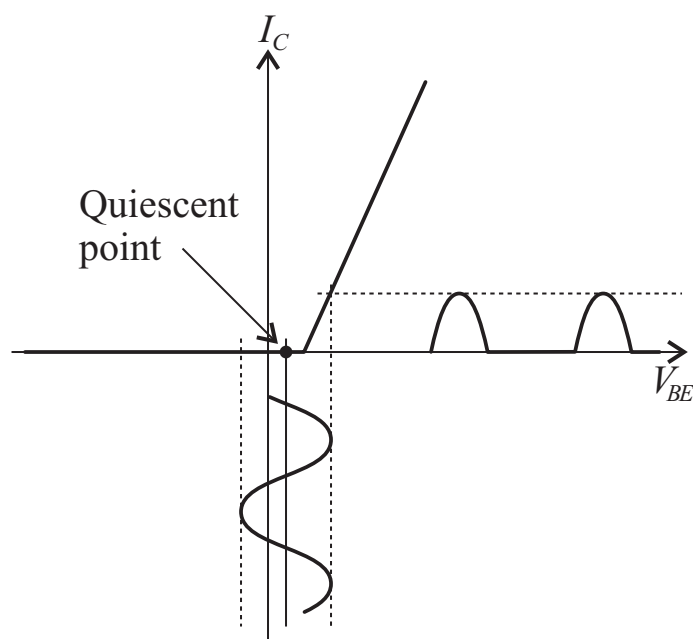
(a) Class A



(b) Class B

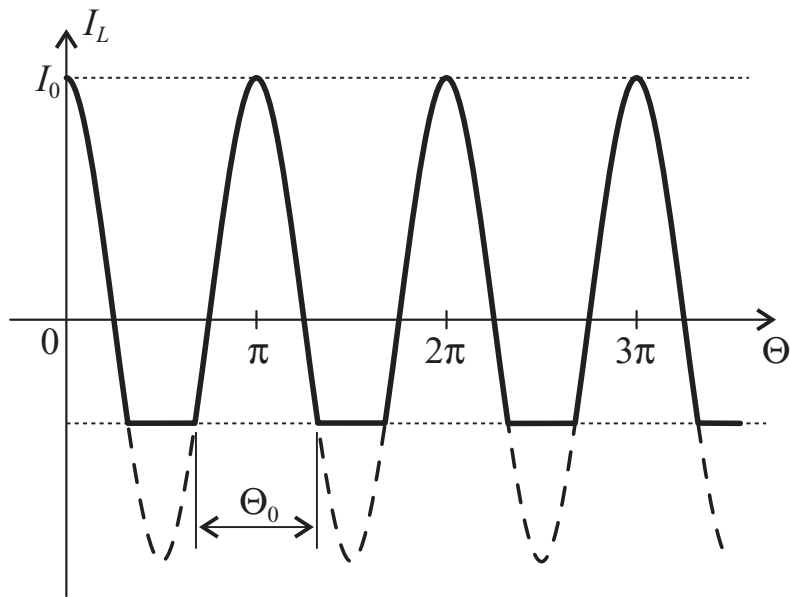


(c) Class AB

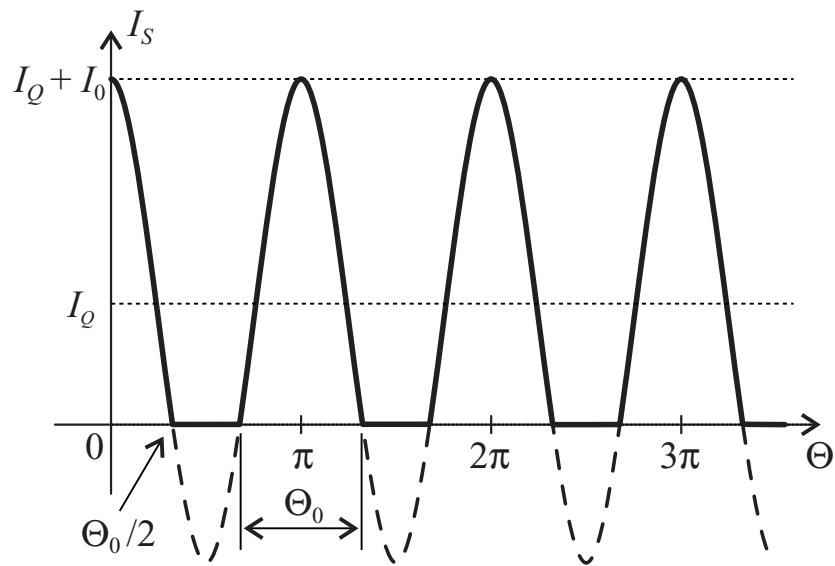


(d) Class C

Figure 8-29 Various classes of amplifier operation.



(a) Load current waveform at the output of the transistor



(b) Corresponding power supply current waveform

Figure 8-30 Load and power supply current waveforms as a function of conduction angle.

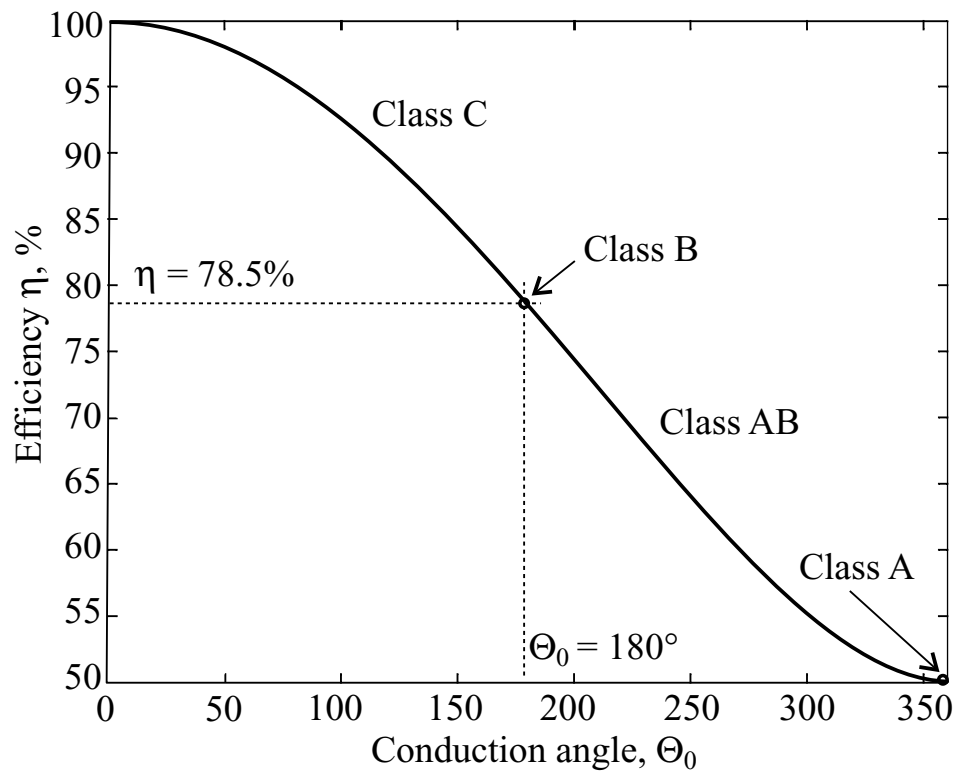


Figure 8-31 Maximum theoretical efficiency of an ideal amplifier as a function of conduction angle.

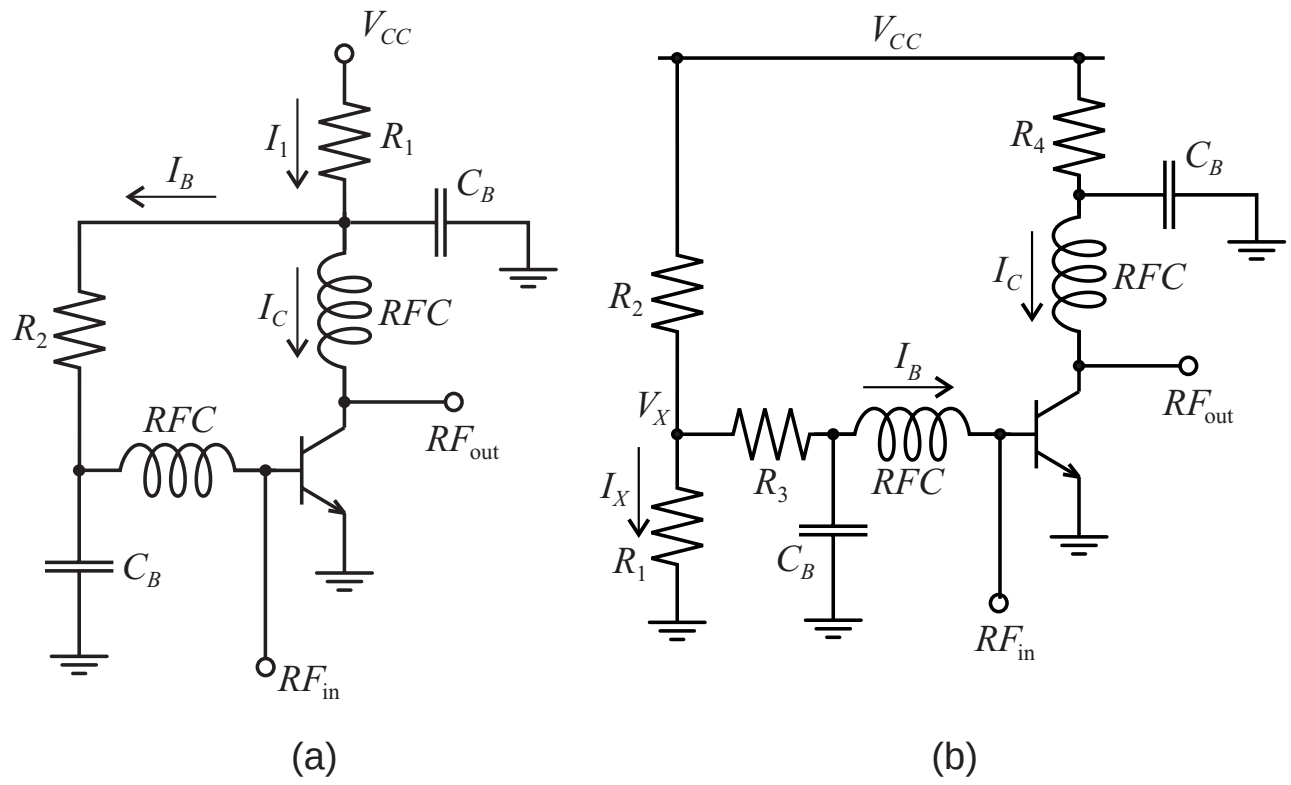


Figure 8-32 Passive biasing networks for an RF BJT in common-emitter configuration.

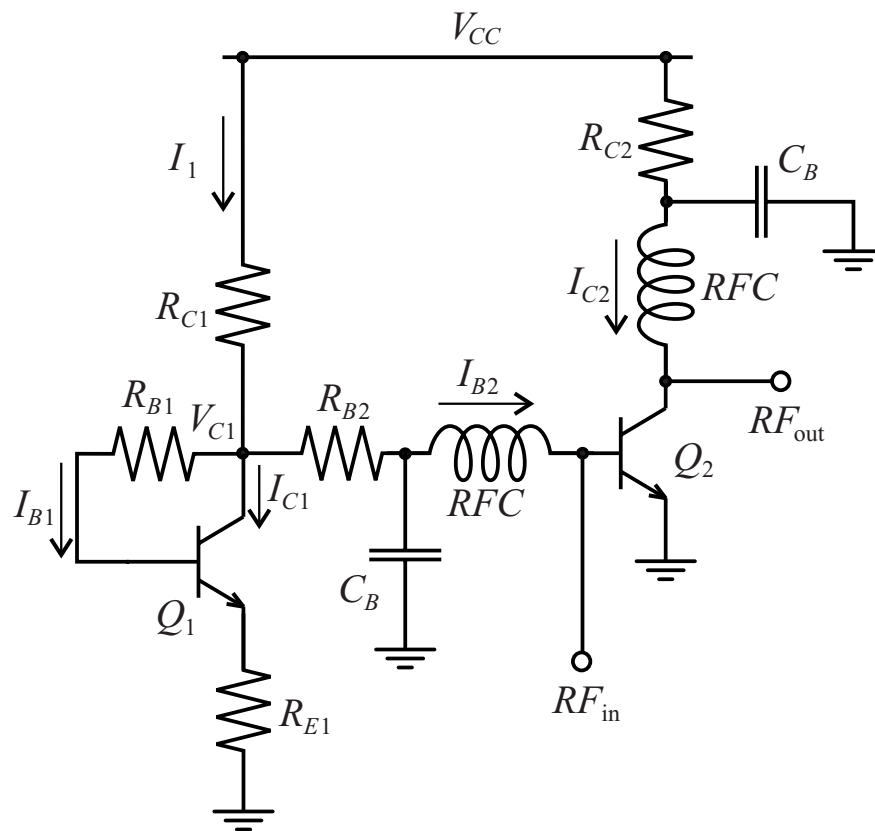


Figure 8-33 Active biasing network for a common-emitter RF BJT.

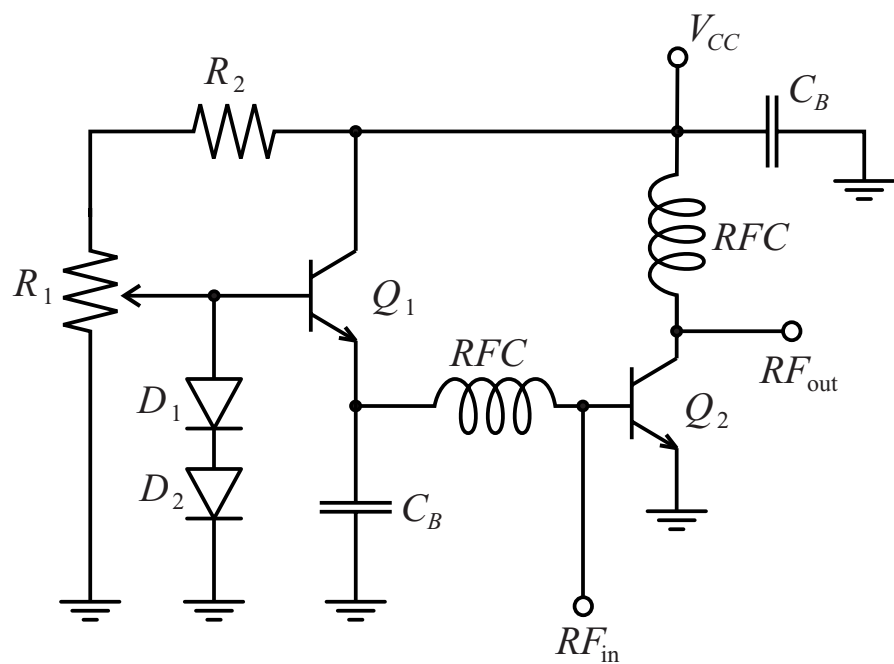


Figure 8-34 Active biasing network containing low-frequency transistor and two diodes.

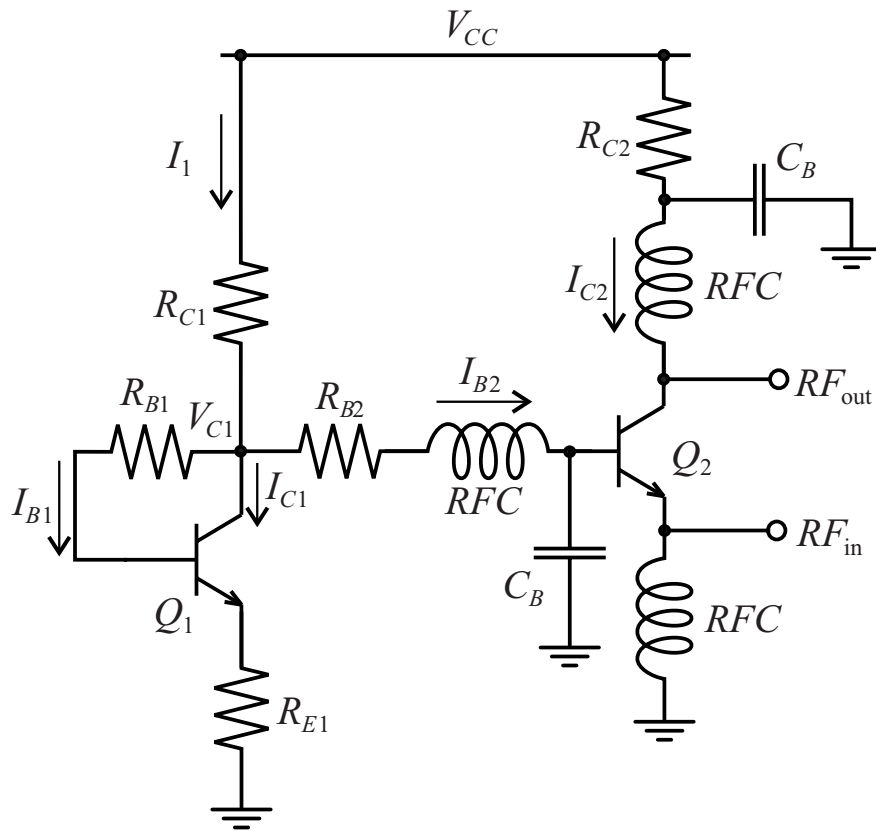


Figure 8-35 Modification of the active biasing network shown in Figure 8-33 for a common-base RF operation.

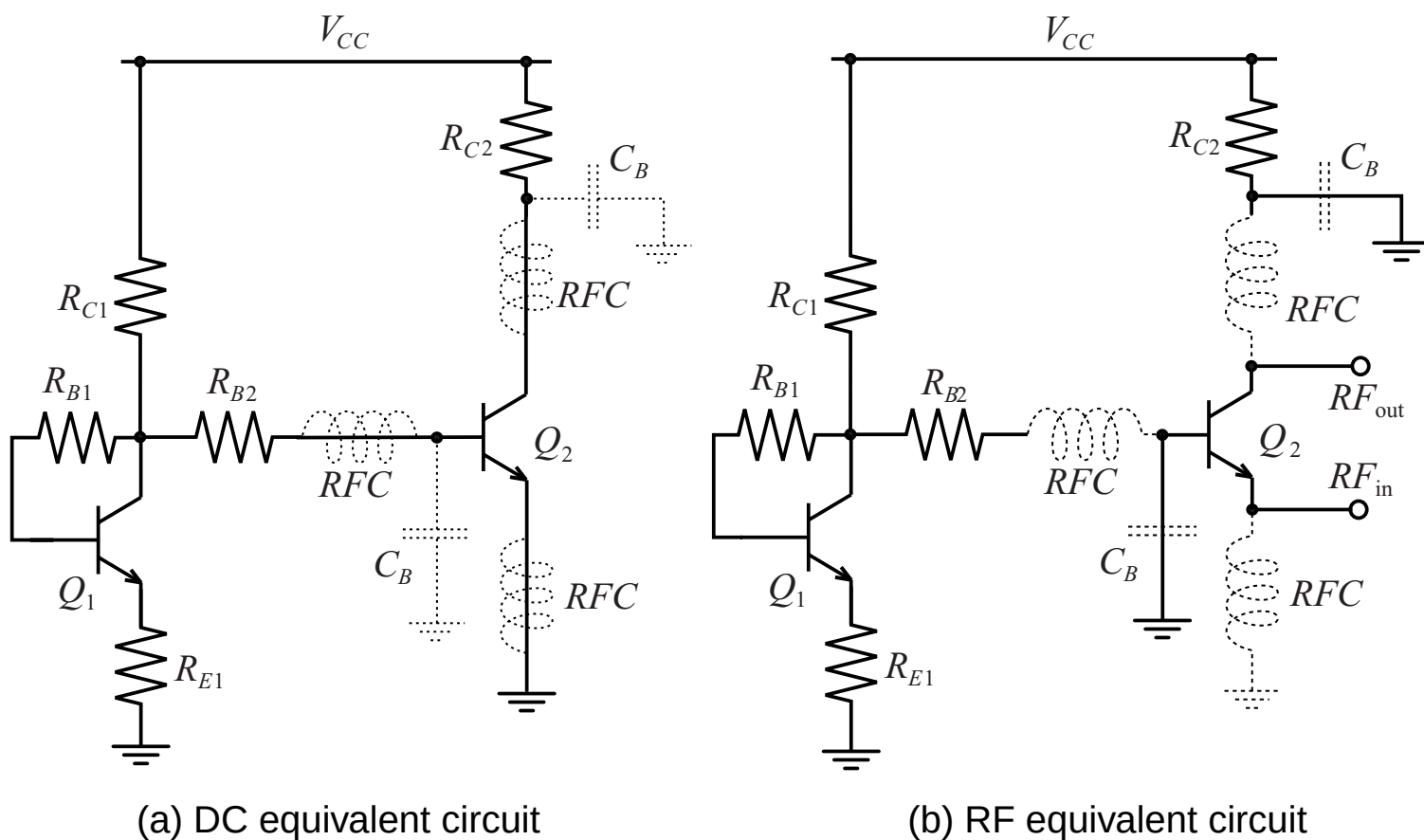


Figure 8-36 DC and RF equivalent circuits for the active biasing network in Figure 8-35.

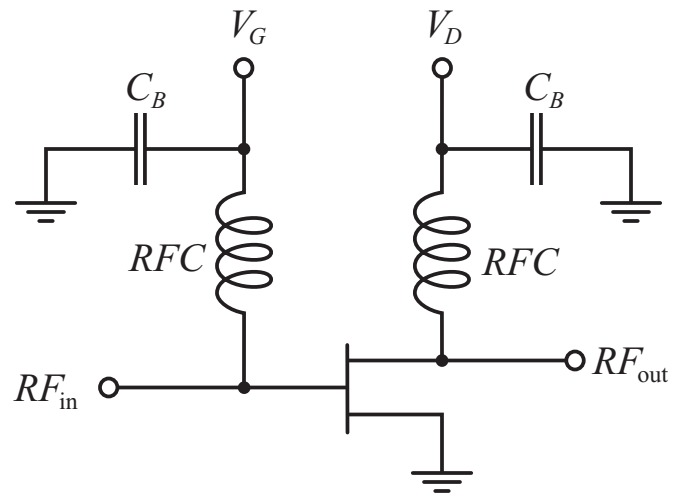


Figure 8-37 Bipolar passive biasing network for FETs.

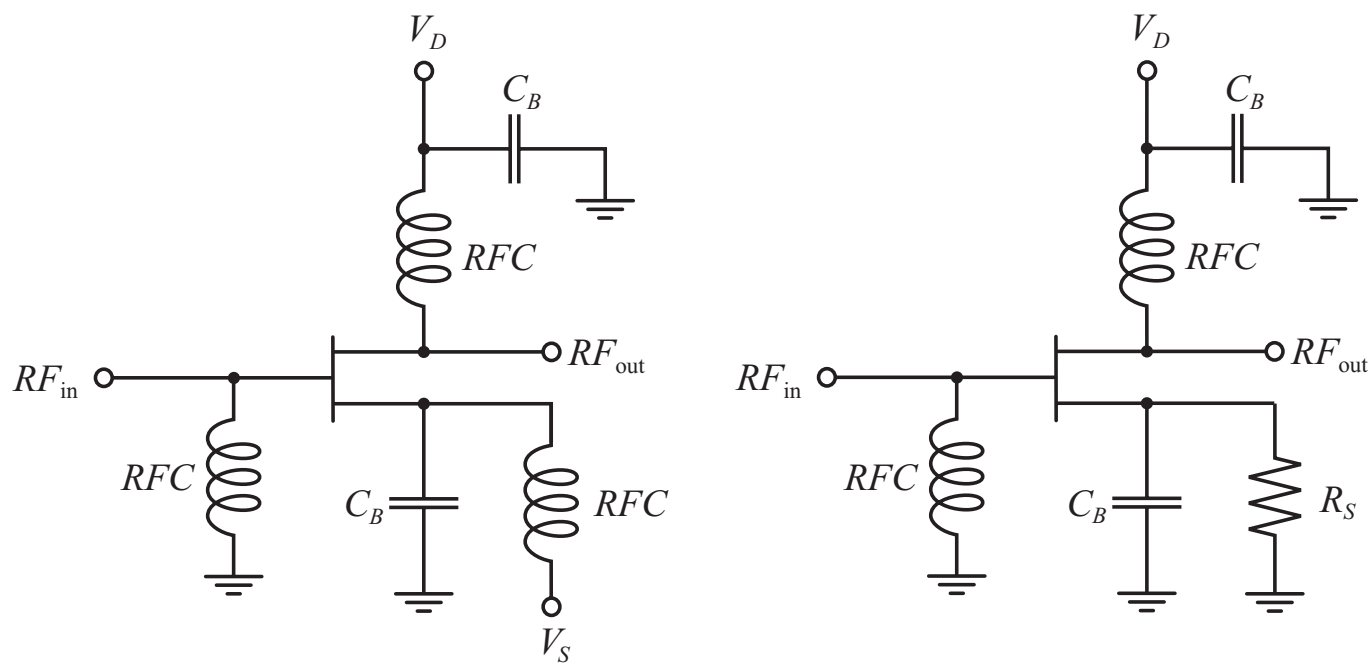


Figure 8-38 Unipolar passive biasing networks for FETs.