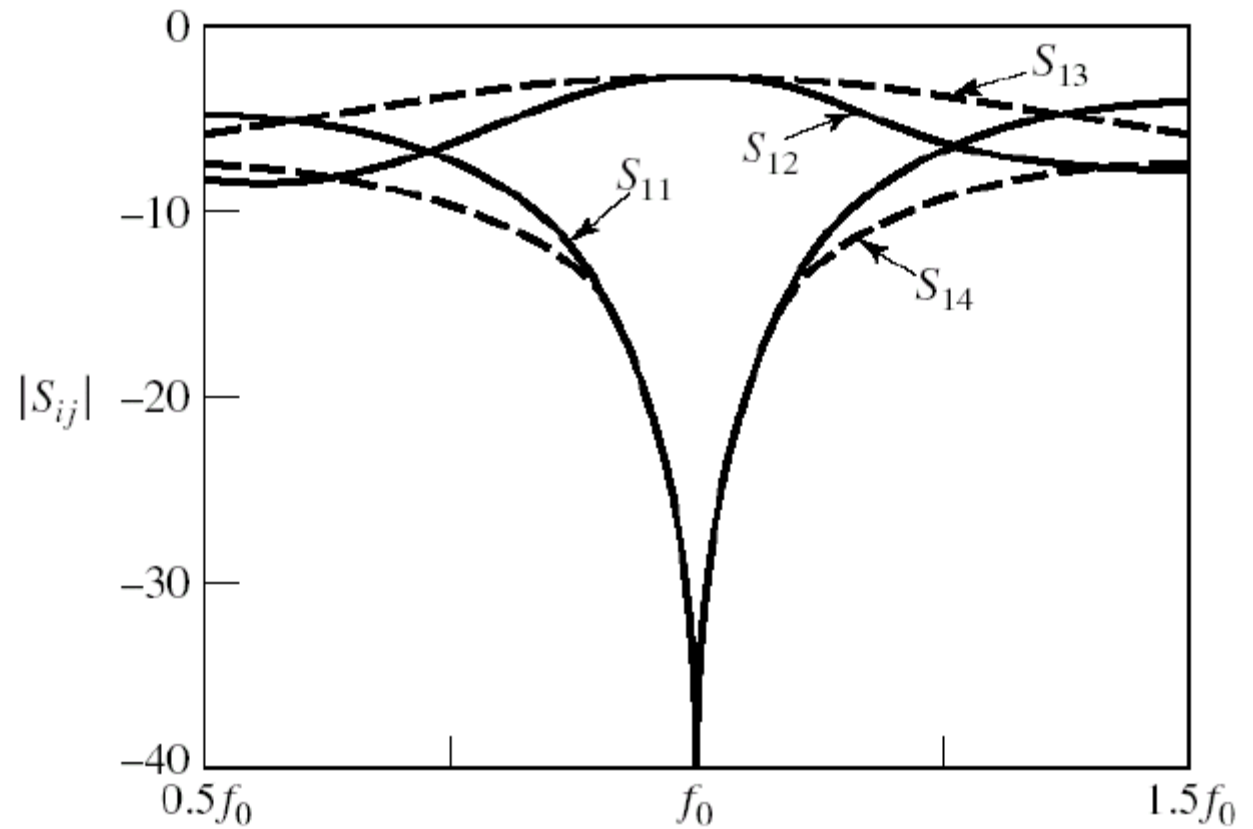
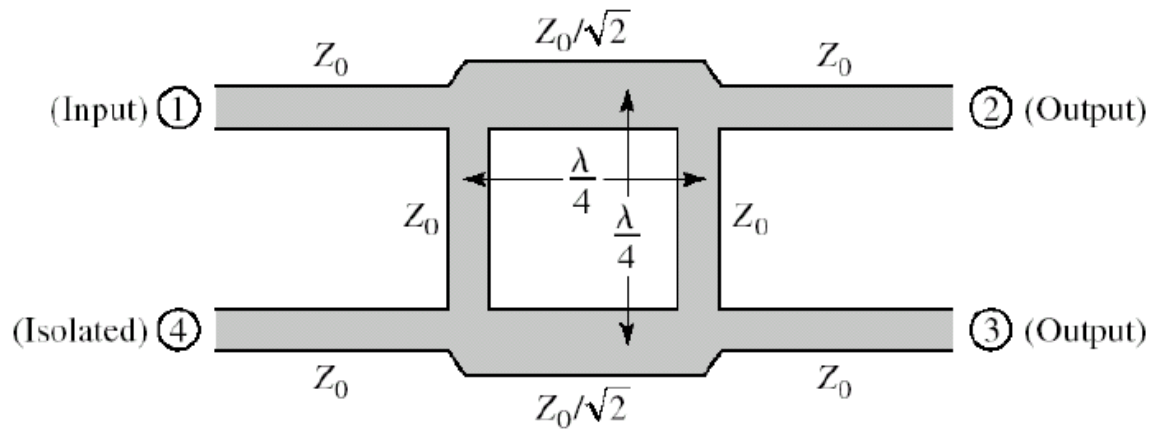


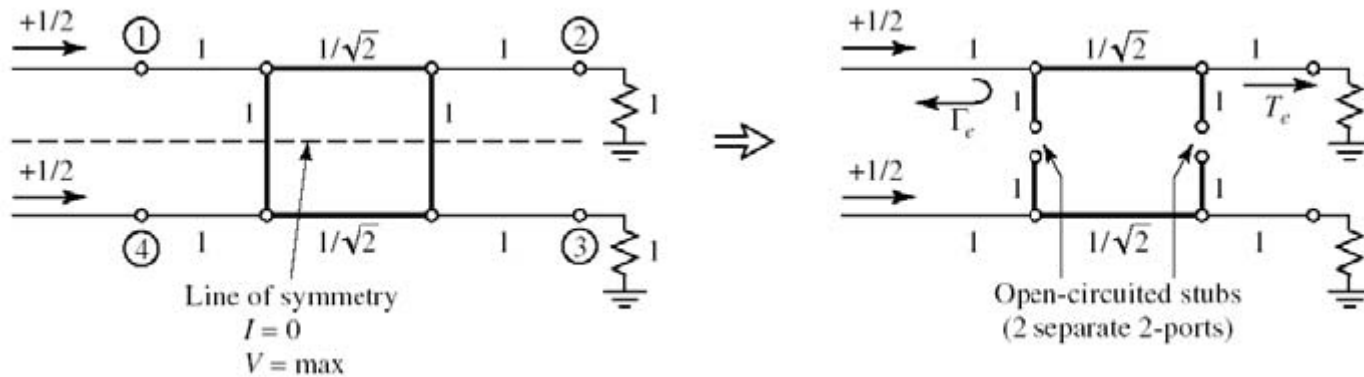
# **90° ve 180° Yol Vericiler**

**90° Yol Verici**

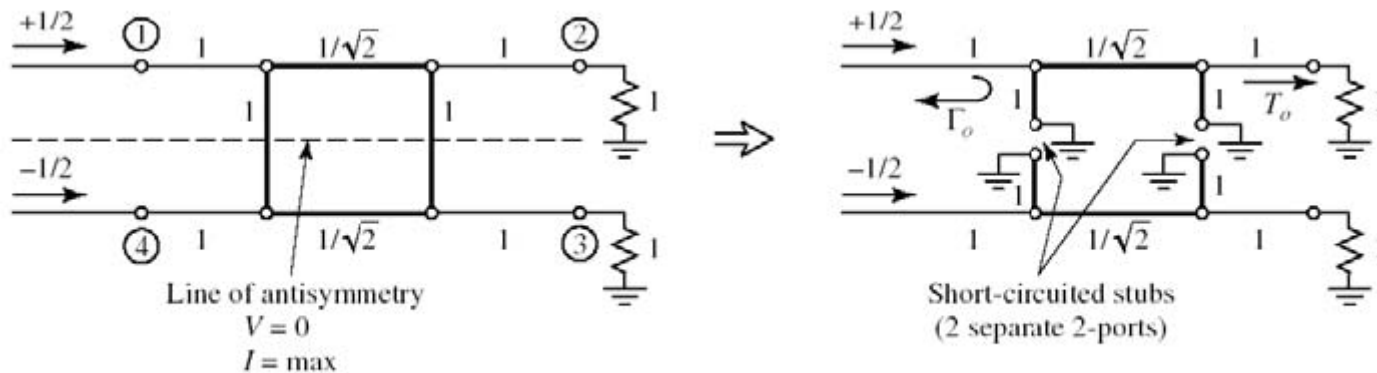
# 90° Yol Verici



# 90° Yol Verici – Tek Kip, Çift Kip İnceleme



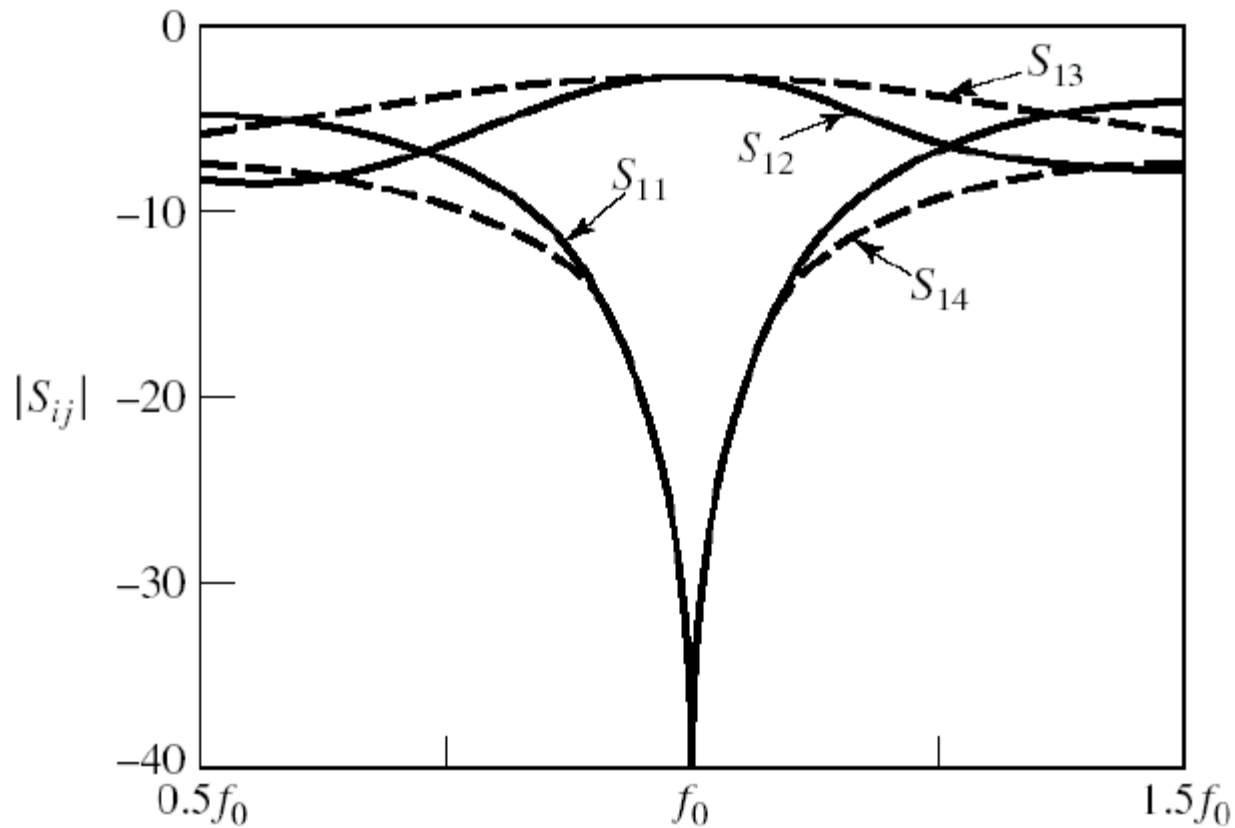
(a)



(b)

# 90° Yol Verici

$$\mathbf{S} = \begin{bmatrix} 0 & 1/\sqrt{2} & j/\sqrt{2} & 0 \\ 1/\sqrt{2} & 0 & 0 & j/\sqrt{2} \\ j/\sqrt{2} & 0 & 0 & 1/\sqrt{2} \\ 0 & j/\sqrt{2} & 1/\sqrt{2} & 0 \end{bmatrix}$$

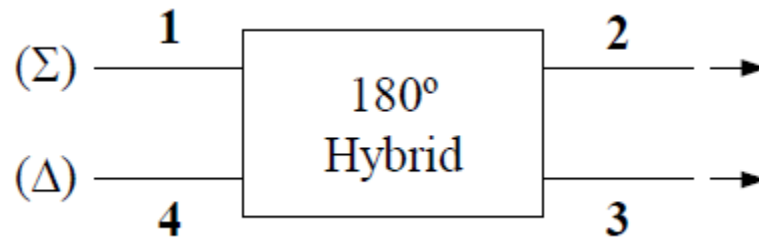


**180° Yol Verici**

# 180° Yol Verici

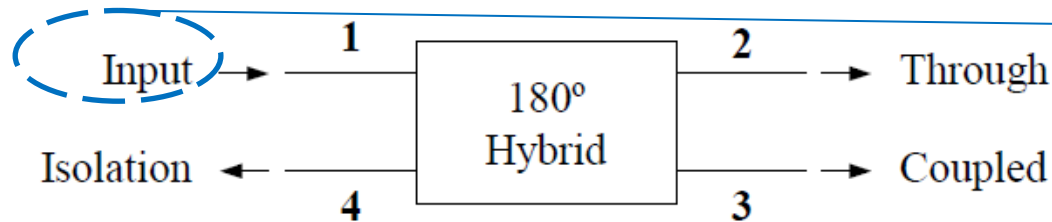
Çıkışlar arası 180° faz farkı olabilir

$$[S] = \frac{-j}{\sqrt{2}} \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & -1 \\ 1 & 0 & 0 & 1 \\ 0 & -1 & 1 & 0 \end{bmatrix}$$



# 180° Yol Verici – Üç farklı İşlev

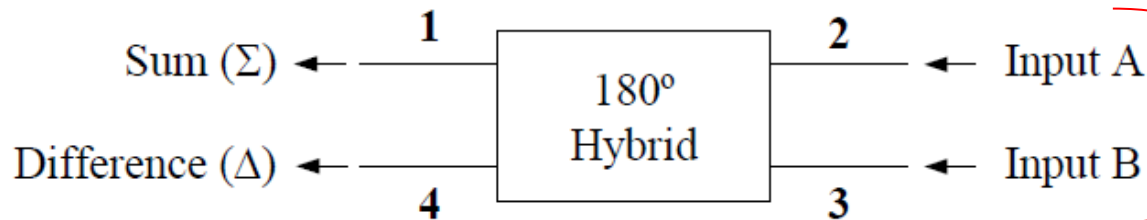
In-phase power splitter:



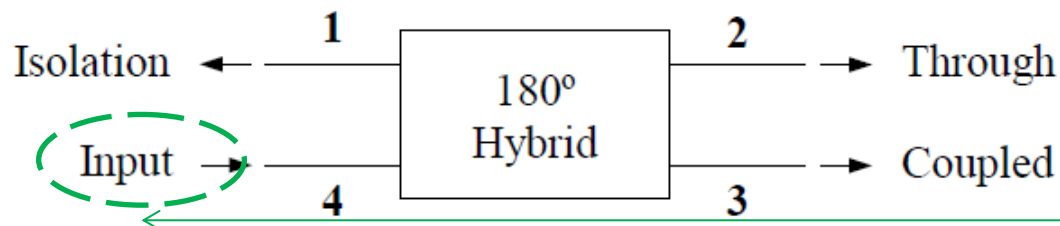
$$[S] = \frac{-j}{\sqrt{2}} \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & -1 \\ 1 & 0 & 0 & 1 \\ 0 & -1 & 1 & 0 \end{bmatrix}$$

The matrix is partitioned into four 2x2 blocks. The top-left block (ports 1,2 to ports 1,2) is circled in blue. The top-right block (ports 1,2 to ports 3,4) is circled in green. The bottom-left block (ports 3,4 to ports 1,2) is circled in red. The bottom-right block (ports 3,4 to ports 3,4) is circled in green.

Power combiner:



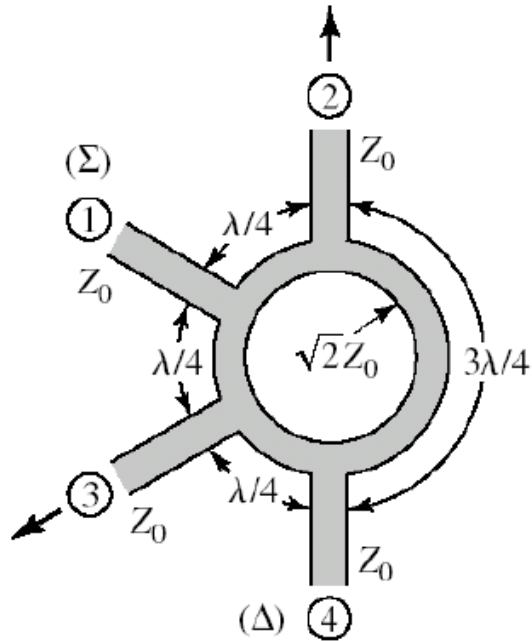
Out-of-phase power splitter:



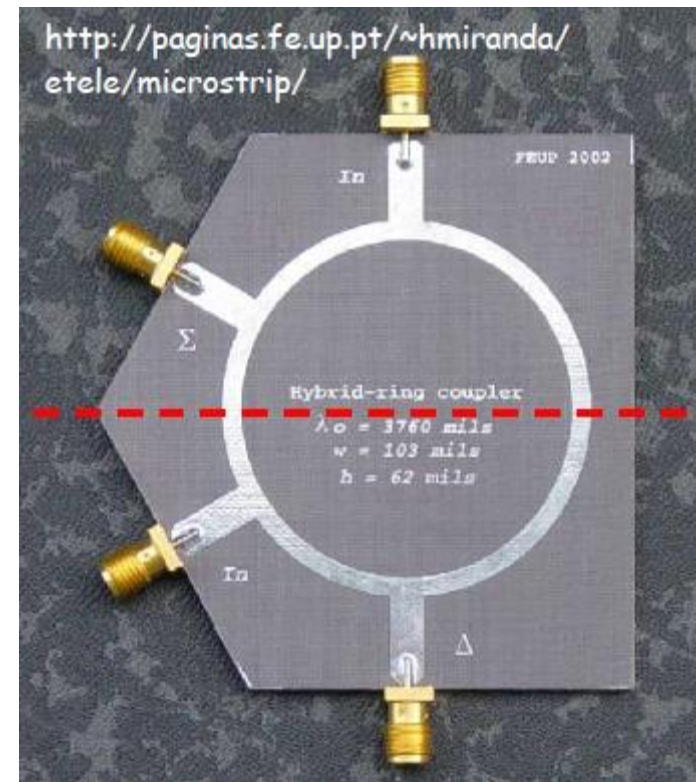


**Halka Yol Verici**

# Halka Yol Verici

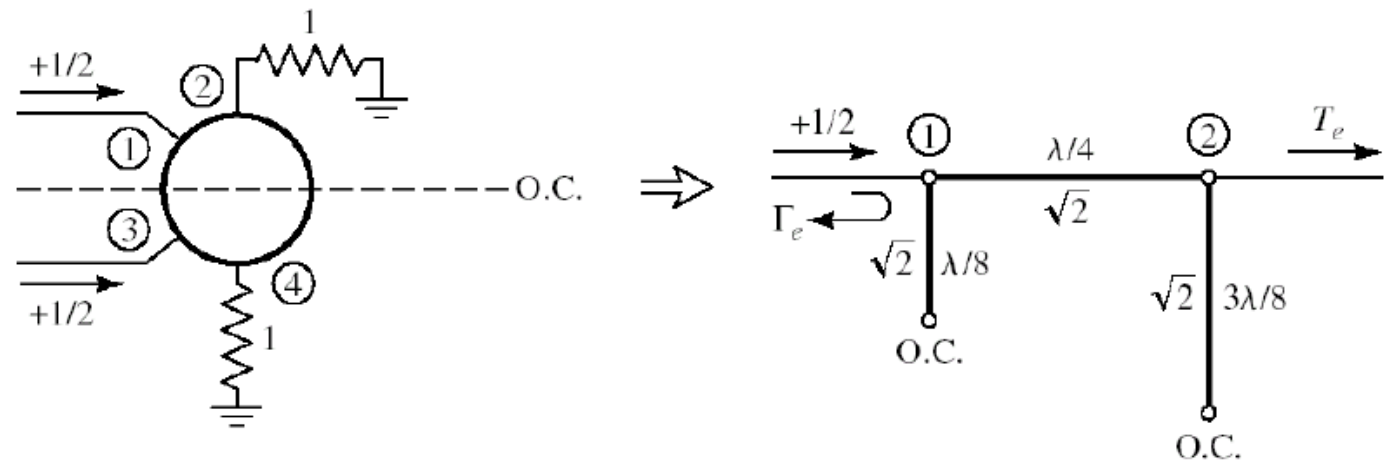


$$S = \begin{bmatrix} 0 & 1/\sqrt{2} & 1/\sqrt{2} & 0 \\ 1/\sqrt{2} & 0 & 0 & -1/\sqrt{2} \\ 1/\sqrt{2} & 0 & 0 & 1/\sqrt{2} \\ 0 & -1/\sqrt{2} & 1/\sqrt{2} & 0 \end{bmatrix}$$

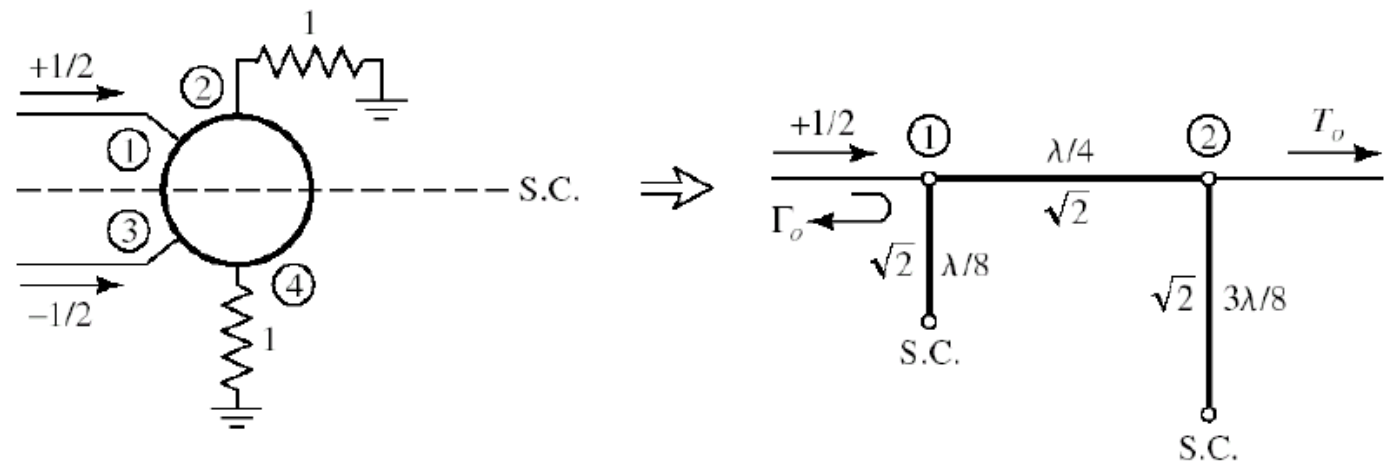


# Halka Yol Verici

Uç 1 uyartılırsa



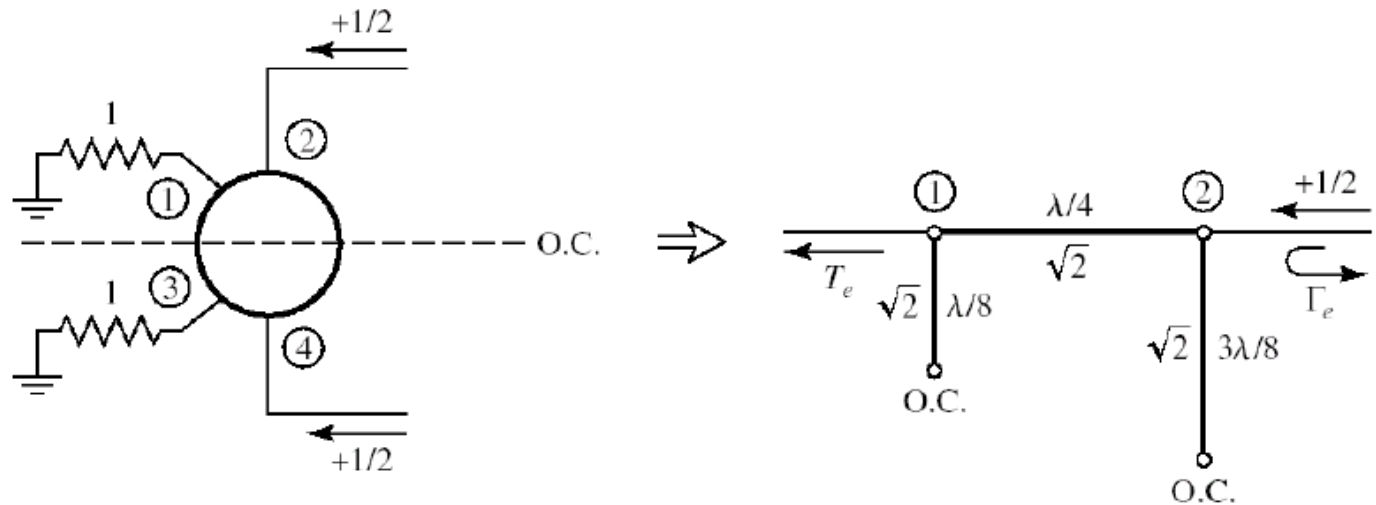
(a)



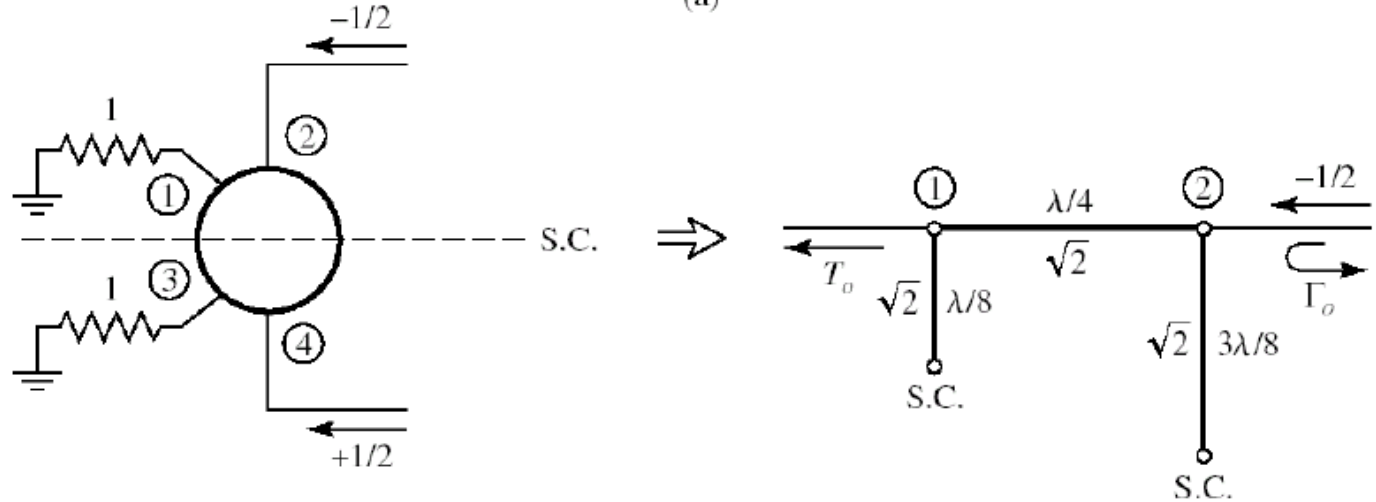
(b)

# Halka Yol Verici

Uç 4 uyartılırsa



(a)



(b)

# Halka Yol Verici

$$\mathbf{S} = \begin{bmatrix} 0 & 1/\sqrt{2} & 1/\sqrt{2} & 0 \\ 1/\sqrt{2} & 0 & 0 & -1/\sqrt{2} \\ 1/\sqrt{2} & 0 & 0 & 1/\sqrt{2} \\ 0 & -1/\sqrt{2} & 1/\sqrt{2} & 0 \end{bmatrix}$$

