

Efficacité du système global.

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1 Filtering chain.

The chain under consideration correspond to the schematic shown in Figure 1.

The signals b_1 and b_2 take the expressions:

$$b_1 = -j \frac{a_1}{\sqrt{2}} \left[\frac{S_{21}^{F1} (1 - S_{22}^{F2} S_{22}^A) - j S_{21}^{F2} S_{12}^A S_{22}^{F1}}{(1 - S_{22}^{F2} S_{22}^A) (1 - S_{22}^{F1} S_{11}^A) - S_{21}^A S_{12}^A S_{22}^{F1} S_{22}^{F2}} \right] \quad (1)$$

$$b_2 = -\frac{a_1}{\sqrt{2}} \left[\frac{S_{21}^{F2} (1 - S_{22}^{F1} S_{11}^A) + j S_{21}^{F1} S_{12}^A S_{22}^{F2}}{(1 - S_{22}^{F2} S_{22}^A) (1 - S_{22}^{F1} S_{11}^A) - S_{21}^A S_{12}^A S_{22}^{F1} S_{22}^{F2}} \right] \quad (2)$$

L'efficacité du système E_S est calculé en fonction de l'efficacité de l'antenne E_A comme:

$$E_S = \frac{\frac{1}{2} |b_1 S_{31}^A|^2 + \frac{1}{2} |b_2 S_{42}^A|^2}{A_1 + A_2} \quad |S_{31}^A|^2 = (1 - |S_{11}^A|^2) E_A \quad |S_{42}^A|^2 = (1 - |S_{22}^A|^2) E_A \quad (3)$$

Ou A_1 et A_2 représentent la puissance accepté par le filtre 1 et le filtre 2 respectivement.

$$A_1 = \frac{1}{2} \left| \frac{-j a_1}{\sqrt{2}} S_{21}^{F1} \right| \quad A_2 = \frac{1}{2} \left| \frac{-a_1}{\sqrt{2}} S_{21}^{F2} \right| \quad (4)$$

Finalement l'efficacité du système c'est:

$$E_S = \frac{|S_{21}^{F1} (1 - S_{22}^{F2} S_{22}^A) - j S_{21}^{F2} S_{12}^A S_{22}^{F1}|^2 (1 - |S_{11}^A|^2) + |S_{21}^{F2} (1 - S_{22}^{F1} S_{11}^A) + j S_{21}^{F1} S_{12}^A S_{22}^{F2}|^2 (1 - |S_{22}^A|^2)}{(|S_{21}^{F1}|^2 + |S_{21}^{F2}|^2) \cdot |(1 - S_{22}^{F2} S_{22}^A) (1 - S_{22}^{F1} S_{11}^A) - S_{21}^A S_{12}^A S_{22}^{F1} S_{22}^{F2}|^2} E_A$$

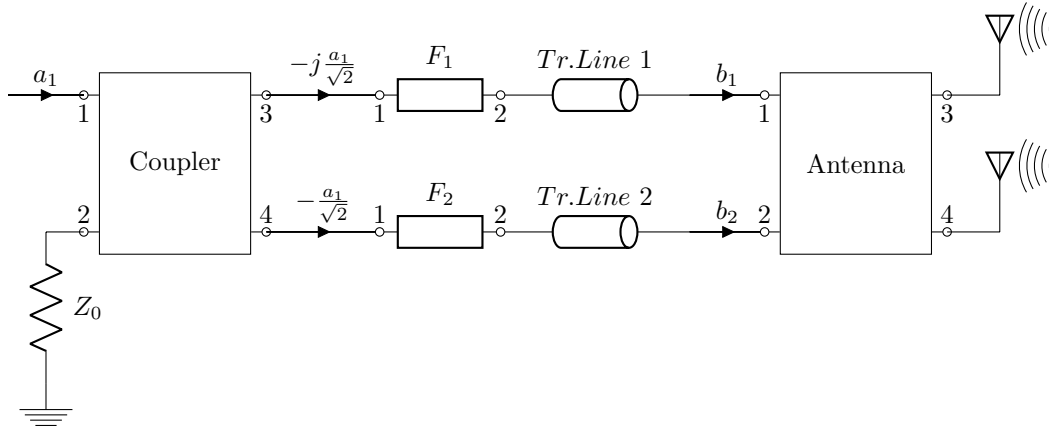


Figure 1: Complete chain chain.