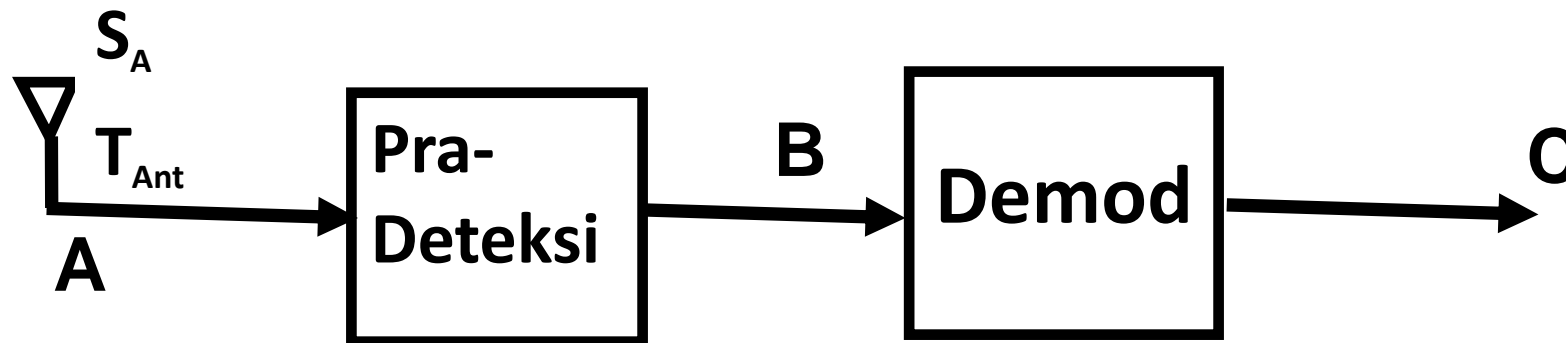


Sistem Komunikasi 1

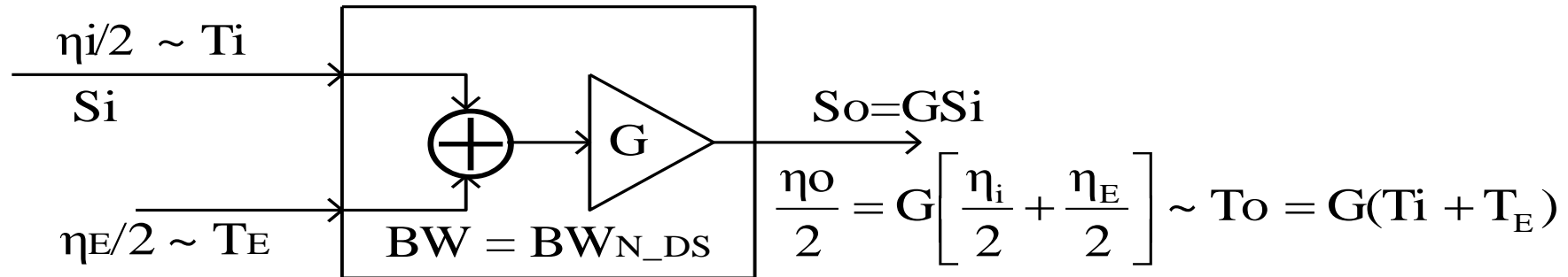
Bab 6

Sistem Pra-Deteksi

Sistem Pra Deteksi



Model Penguat Double Sided



$\frac{\eta_o}{2}$ = rapat daya noise output

T_o = termal ekuivalen noise output

S_i = daya input

S_o = daya output

$\frac{\eta_i}{2}$ = rapat daya noise input

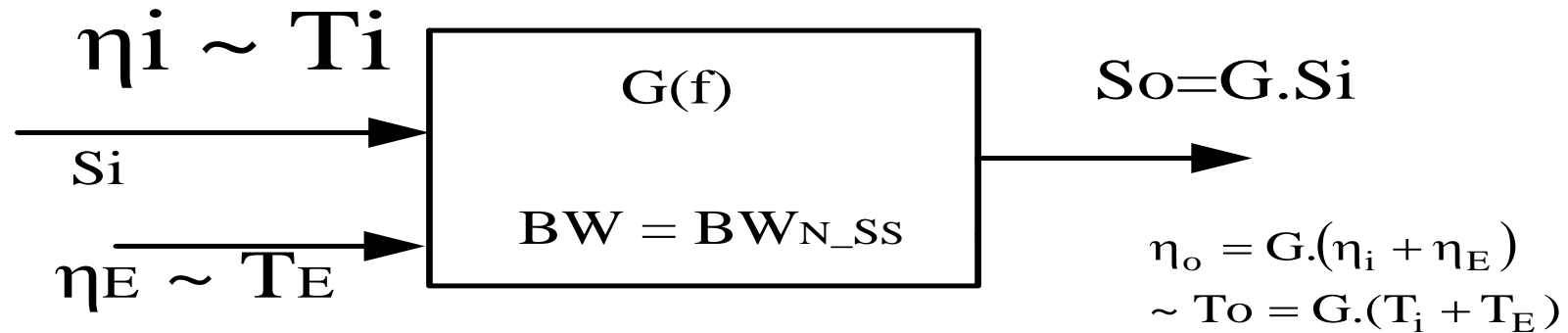
$\frac{\eta_E}{2}$ = thermal ekuivalen noise input

= rapat daya noise internal

T_E = termal ekuivalen noise internal

G = gain

Model Penguat Single Sided



η_E = rapat daya noise internal

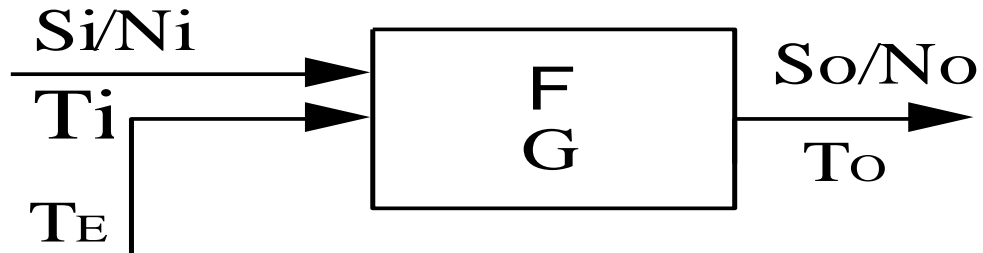
η_i = rapat daya noise input

η_o = rapat daya noise output

S_i = daya input

S_o = daya output

Noise Figure (F/NF)



Noise figure \equiv perbandingan antara daya derau *output* aktual (sebenarnya) terhadap daya derau output jika sistem *noiseless*(ideal), dengan asumsi:

- ⊕ Derau *input* pada $T_{i0} = 290 \text{ }^\circ\text{K}$
- ⊕ Lebar pita BW signal= BW 3dB sistem

$$\frac{S_o}{N_o} = \frac{S_i \cdot G}{G \cdot k(T_i + T_e) B_N} = \frac{S_i}{k(T_i + T_e) B_N}$$

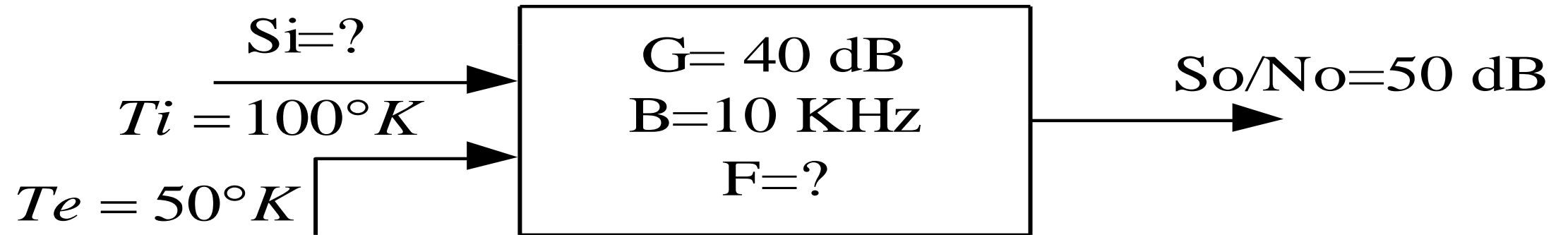
$$\frac{S_o}{N_o} (dB) = 10 \log \frac{S_i}{k(T_i + T_e) B_N}$$



Noise Figure dan SNR (S/N)

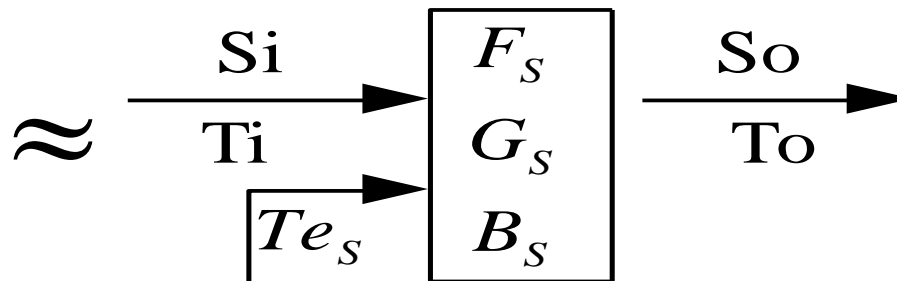
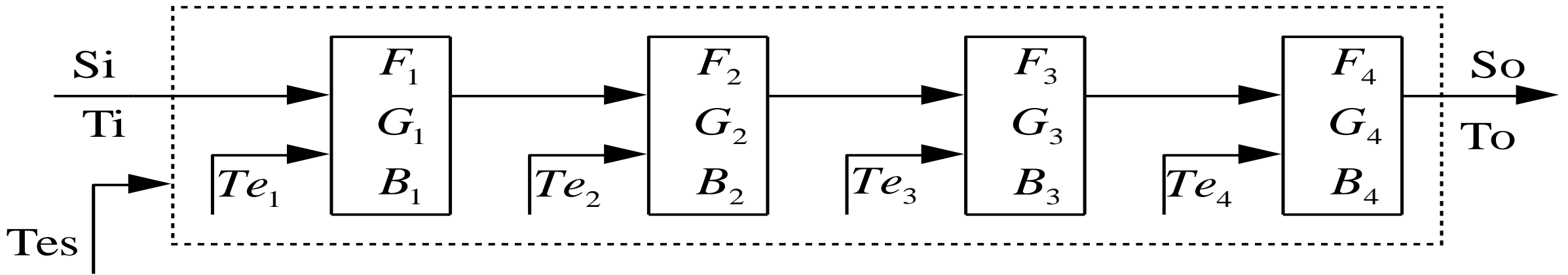
$$\Rightarrow F = 1 + \frac{T_e}{T_{io}} = 1 + \frac{T_e}{290^\circ K}$$

Penguat



- Asumsi : BW sinyal = BW 3dB sistem
- BW 3dB = BN ideal

Penguat Kaskade



$$S_o = S_i \cdot G_1 G_2 G_3 G_4 = S_i \cdot G_s \Rightarrow G_s = G_1 G_2 G_3 G_4$$

$$N_o = k(T_i + T_{es}) \cdot B_s \cdot G_s = k \cdot T_o \cdot B_s$$

$$= k \{ [\{ \{ T_i + T_{e1} \} \cdot G_1 + T_{e2} \} G_2 + T_{e3}] G_3 + T_{e4} \} G_4 \cdot B_4$$

$$= k [T_i G_1 G_2 G_3 G_4 + T_{e1} G_1 G_2 G_3 G_4 + T_{e2} G_2 G_3 G_4 + T_{e3} G_3 G_4 + T_{e4} G_4] \cdot B_4$$

$$N_o = k \left[T_i + T_{e1} + \frac{T_{e2}}{G_1} + \frac{T_{e3}}{G_1 G_2} + \frac{T_{e4}}{G_1 G_2 G_3} \right] G_s \cdot B_4$$

$$T_{es} = T_{e1} + \frac{T_{e2}}{G_1} + \frac{T_{e3}}{G_1 G_2} + \frac{T_{e4}}{G_1 G_2 G_3} \text{ dan } B_s = B_4 |_{min}$$

$$F_s \triangleq \frac{N_o}{K \cdot T_i \cdot B_s \cdot G_s} = \frac{k \cdot (T_i + T_{es}) \cdot B_4 G_s}{K \cdot T_i \cdot B_4 G_s} \Rightarrow F_s = 1 + \frac{T_{es}}{T_i} = 1 + \frac{T_{es}}{290^\circ K}$$

$$F_s = F_1 + \frac{F_2 - 1}{G_1} + \frac{F_3 - 1}{G_1 G_2} + \frac{F_4 - 1}{G_1 G_2 G_3} \quad \text{Rumus FRISS}$$

End of Module 6
