

$$\begin{aligned}
P_e &= P_{e(p)} + P_{e(s)} \\
&= I_{lm(p)}^2 R_{dc(p)} \frac{T_{k(p)} + T_{lm}}{T_{k(p)} + T_{dc}} + I_{lm(s)}^2 R_{dc(s)} \frac{T_{k(s)} + T_{lm}}{T_{k(s)} + T_{dc}} \\
&= I_{lm(p)}^2 \left[R_{dc(p)} \frac{T_{k(p)} + T_{lm}}{T_{k(p)} + T_{dc}} + \left[\frac{N_1}{N_2} \right]^2 R_{dc(s)} \frac{T_{k(s)} + T_{lm}}{T_{k(s)} + T_{dc}} \right] \quad (4-6)
\end{aligned}$$