RISPOSTA A INGRESSI SINUSOIDALI

$$\boxed{u(t) = \operatorname{sen}(\tilde{\omega} t)}$$

$$e(t) = K_d \cdot u(t) - y(t)$$

$$e(s) = W_e(s) \cdot u(s)$$

STESSA PULSAZIONE DELL'INGRESSO

$$\tilde{e}(t) = |W_e(j\tilde{\omega})| \operatorname{sen}(\tilde{\omega} t + \angle W_e(j\tilde{\omega})) \rightarrow |\tilde{e}(t)| \leq |W_e(j\tilde{\omega})|$$

$$d_1(t) = \operatorname{sen}(\tilde{\omega} t)$$

$$\tilde{Y}_{d1}(t) = |W_{d1}(j\tilde{\omega})| \operatorname{sen}(\tilde{\omega} t + \angle W_{d1}(j\tilde{\omega}))$$

$$W_{d1}(s) = \frac{1}{1 + \frac{F(s)}{K_d}} \qquad |W_{d1}(j\omega)| = \frac{1}{\left|1 + \frac{F(j\omega)}{K_d}\right|}$$

$$\left.\right\} |\tilde{Y}_{d1}(t)| \leq \left|\frac{1}{1 + \frac{F(j\omega)}{K_d}}\right|$$

$$W_e(s) = K_d - W(s) = K_d - \frac{F(s)}{1 + \frac{F(s)}{K_d}} =$$

$$= \frac{K_d + F(s) - F(s)}{1 + \frac{F(s)}{K_d}} = \frac{K_d^2}{K_d + F(s)}$$

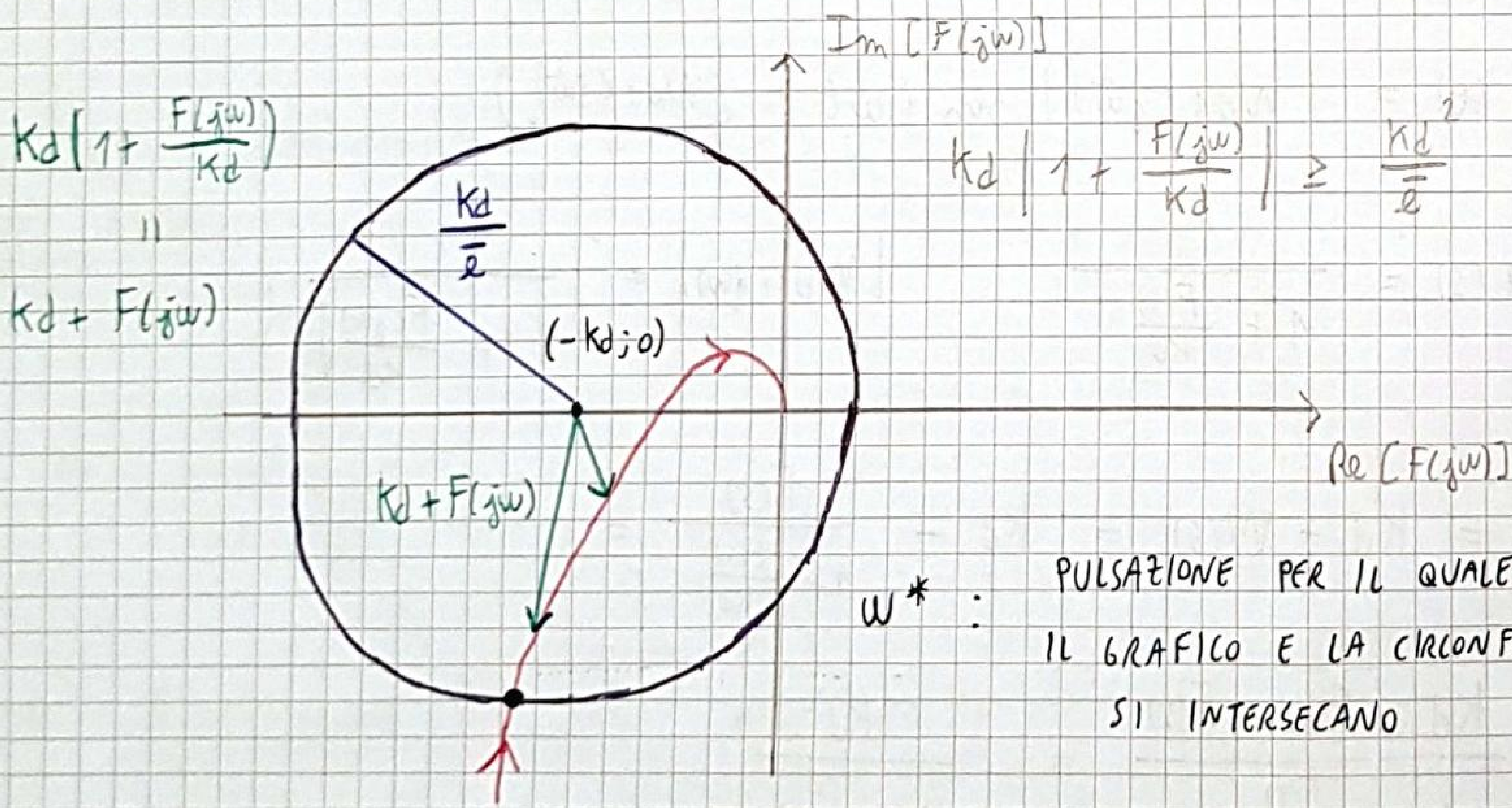
$$|W_e(j\omega)| = \frac{K_d^2}{|K_d + F(j\omega)|} = \frac{K_d}{\left|1 + \frac{F(j\omega)}{K_d}\right|}$$

Desidero che l'ampiezza dell'errore a regime permanente sia limitata

$$|\tilde{e}(t)| \leq |W_e(j\omega)| \leq \bar{e}$$

$$|W_e(j\omega)| \leq \bar{e} \longleftrightarrow \frac{K_d}{\left|1+\frac{F(j\omega)}{K_d}\right|} \leq \bar{e}$$

$$\longrightarrow \left|1+\frac{F(j\omega)}{K_d}\right| \geq \frac{K_d}{\bar{e}}$$



ω^* : PULSAZIONE PER IL QUALE IL GRAFICO E LA CIRCONFERENZA SI INTERSECANO

$$1+\frac{F(j\omega^*)}{K_d} = \frac{K_d}{\bar{e}}$$

- $\omega \leq \omega^* \longrightarrow \left|1+\frac{F(j\omega)}{K_d}\right| \geq \frac{K_d}{\bar{e}}$ ✓

- $\omega > \omega^* \longrightarrow \left|1+\frac{F(j\omega)}{K_d}\right| < \frac{K_d}{\bar{e}}$