





$$e_{\text{reg}} = \lim_{k \rightarrow \infty} \widetilde{e}(k) = \lim_{z \rightarrow 1} (1 - z^{-1}) E(z)$$

$$\lim_{s \rightarrow 0} s E(s)$$

$$\begin{aligned}
 e_{\text{reg}} &= \lim_{z \rightarrow 1} \left(\cancel{1-z^{-1}} \right) \frac{1}{1+G(z)} \cancel{R(z)} \\
 &\parallel \\
 &0 \\
 \lim_{z \rightarrow 1} G(z) &= \pm\infty
 \end{aligned}$$

$$\frac{z}{z-1} = \frac{1}{1-z^{-1}}$$

$$G(z) \equiv G(z) \cdot D(z)$$

$$G(z) = \frac{(z-z_1) \cdots (z-z_m)}{(z-1)^N (z-z_{p_1}) \cdots (z-z_{p_n})}$$

 s^N

$$z = e^{sT}$$