pole splitting
phase margin
mirror doubled
RHP zero

pole splitting (Miller Compensation)

\[ E = \frac{s_m}{1 + s_m k_{offs}} \]

\[ R_0 = 1 \Omega \quad R_{02} = 10 k \Omega \]

\[ C_i = 1 \mu F \quad C_L = 1 \mu F \]

\[ \omega_p = 10^6 \quad \omega_p = 10^8 \]

Benefits: less capacitance, more BW
Cost: slower rise

Ignore:
- PZ double
- RHP Z

\[ C_{miller} = C_c (1 - A_{v2}) = C_c \left( 1 + \frac{g_{m4} R_{02}}{1 + s \omega_p} \right) \]

\[ = C_c \left( 1 + \frac{5 \omega_p}{1 + s \omega_p} \right) \]

\[ = C_c \left( 1 + A_{v2,0} \right) \left( 1 + \frac{5}{(1 + A_{v2,0}) \omega_p} \right) \]

\[ = C_c \left( 1 + A_{v2,0} \right) \left( 1 + \frac{5 \omega_p}{1 + \frac{5}{\omega_p} A_{v2,0}} \right) \]

\[ = C_c \left( 1 + A_{v2,0} \right) \frac{\omega_p}{5} \]

\[ \omega_p < \omega_p \]

\[ C_c \left( 1 + A_{v2,0} \right) \frac{\omega_p}{5} \quad \omega_p < \omega_p \frac{5}{A_{v2,0}} \]

\[ \frac{C_c}{A_{v2,0}} \frac{\omega_p}{5} \quad \omega_p < \omega_p \frac{5}{A_{v2,0}} \frac{5}{A_{v2,0}} \]

\[ Z_{miller} = s \frac{1}{C_{miller}} = \frac{1}{C_c (1 + A_{v2,0}) \omega_p} \]
Plunge Margin = \( \angle \) (\( \frac{1}{5} \) \( \frac{1}{5} \)) - \( \angle \) (\( \frac{1}{5} \) \( \frac{1}{5} \))

constrains your choice of how much you plan to use this.

Please measure. For a skeletal system (\( \frac{1}{5} \) \( \frac{1}{5} \))

looks much like a single-pole system.

\[ W = \frac{A}{g} \text{comp} = \frac{9}{g} \text{m} \]

\[ A = \frac{9}{g} \text{m} \text{comp} \]

\[ C = \frac{R}{10} \text{m} \text{comp} \]

\[ \frac{C}{W} = \frac{10}{R} \text{m} \text{comp} \]

\[ C = \frac{W}{R} \text{comp} \]

\[ W > 180 \]

\[ \text{travel split} \]

\[ 9 = 10 \text{m} \text{comp} \]

\[ 9 = 10 \text{m} \]

\[ 9 = \frac{10}{R} \]

\[ 9 = \frac{10}{R} \]