

Jaeger 3rd ed

16.11 refer to prob 16.9

f_L may be raised to 50 Hz by lowering C_2 and making ω_{p2} (f_{p2}) dominant.

Solve

$$2\pi f_L = 2\pi (50 \text{ Hz}) \approx \omega_{p2} = \frac{1}{C_2 (R_S \parallel g_m^{-1})}$$

$\underbrace{\hspace{10em}}_{2097 \Omega}$

(a) $\Rightarrow C_2 = 1.518 \mu\text{F}$

Nearest std. value is $1.5 \mu\text{F}$

(b) Repeat analysis w/o dominant pole approx.

$$\omega_{p1} = 4.108 \text{ rad/s} \quad \omega_{p3} = 19.5 \text{ rad/s}$$

$$\omega_{p2} = 317.9 \text{ rad/s} \quad \omega_{z1} = \omega_{z3} = 0$$

$$\omega_{z2} = 51.28 \text{ rad/s}$$

$$\omega_L \approx \sqrt{\sum_L \omega_{pL}^2 - 2 \sum_L \omega_{zL}^2} = 310.2 \text{ rad/s}$$

$$f_L = 49.4 \text{ Hz}$$