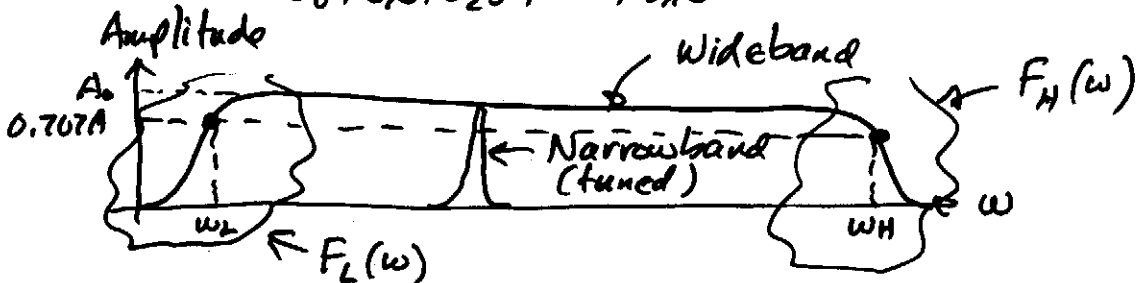


CHAPTER 17 - OVERVIEW

(17.1) Amplifier Frequency Response (wideband amplifiers)

$$A_v(s) = \frac{a_0 + a_1s + a_2s^2 + \dots + a_ms^m}{b_0 + b_1s + b_2s^2 + \dots + b_ns^n} = A_{mb} F_L(s) F_H(s)$$



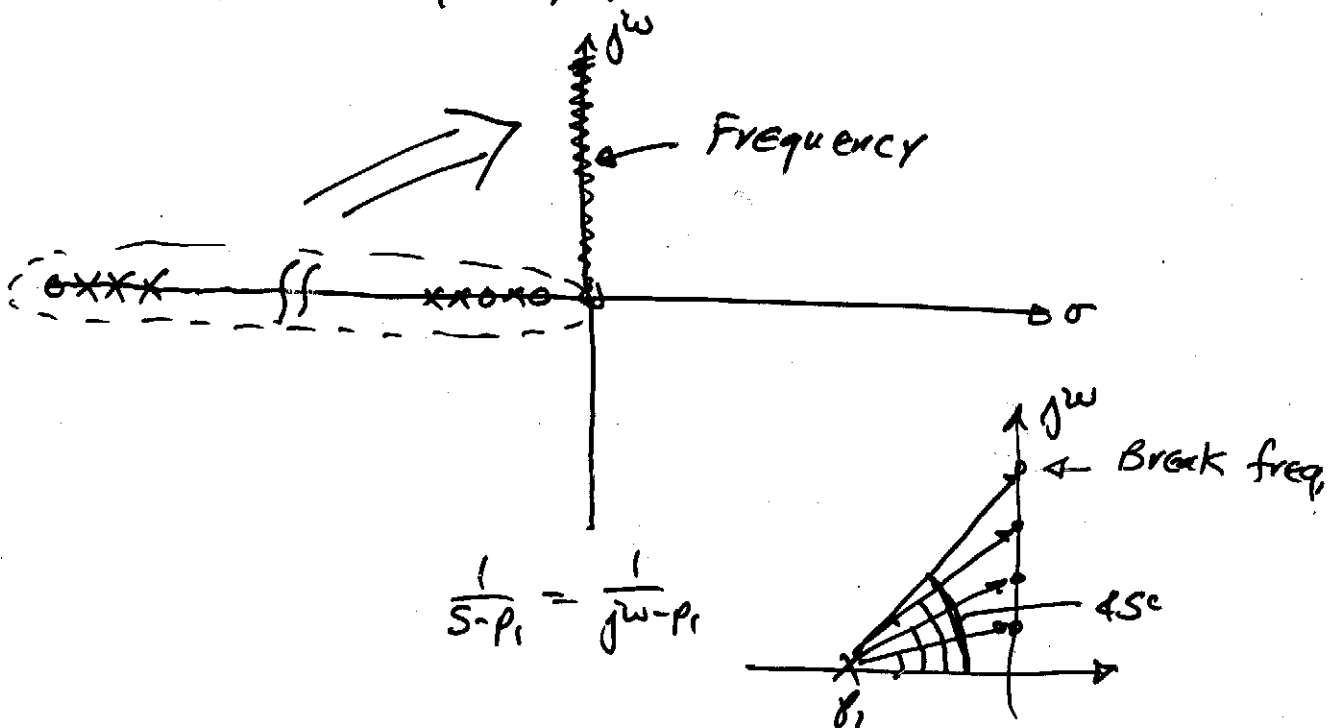
$$F_L(s) = \frac{(s + \omega_{z1}^L)(s + \omega_{z2}^L) \dots (s + \omega_{zm}^L)}{(s + \omega_{p1}^L)(s + \omega_{p2}^L) \dots (s + \omega_{pn}^L)}$$

#zeros = #poles

$$F_L(j\omega) \rightarrow 1 \text{ as } \omega \rightarrow \infty$$

$$F_H(s) = \frac{(1 + \frac{s}{\omega_{z1}^H})(1 + \frac{s}{\omega_{z2}^H}) \dots (1 + \frac{s}{\omega_{zm}^H})}{(1 + \frac{s}{\omega_{p1}^H})(1 + \frac{s}{\omega_{p2}^H}) \dots (1 + \frac{s}{\omega_{pn}^H})}$$

Complex frequency plane -

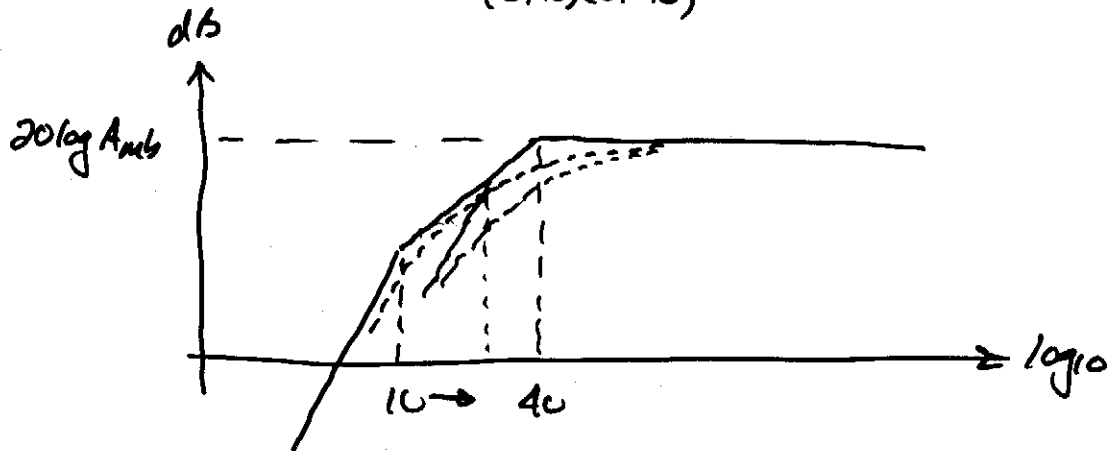


17.1 - Cont'd

To find  $\omega_L$  (lower -3dB frequency)

- 1.)  $\omega_L = \omega_p(\text{dominant})$  if  $\omega_p(\text{dominant}) \geq 4$  next smallest pole

Ex.  $F_L(s) = \frac{s^2}{(s+10)(s+40)}$   $\omega_L \approx 40$  rads/sec.



2.)  $\omega_L \approx \sqrt{\sum_n \omega_{pn}^2 - 2 \sum_n \omega_{zn}^2}$

3.) Use Bode Plot

To find the upper -3dB freq. ( $\omega_H$ )

- 1.)  $\omega_H \approx \omega_p(\text{dominant})$  if  $\omega_p(\text{dominant}) \leq 4$  next largest pole

2.)  $\omega_H \approx \frac{1}{\sqrt{\sum_n \frac{1}{\omega_{pn}^2} - 2 \sum_n \frac{1}{\omega_{zn}^2}}}$

3.) Do the Bode plot.

17.2