

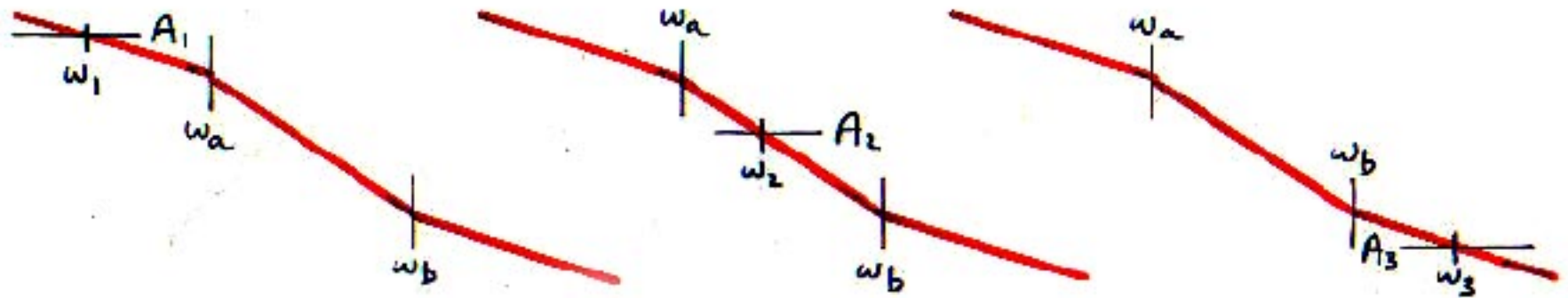
EXERCISE 3.1

SOLUTION

Exercise:

No flat gain

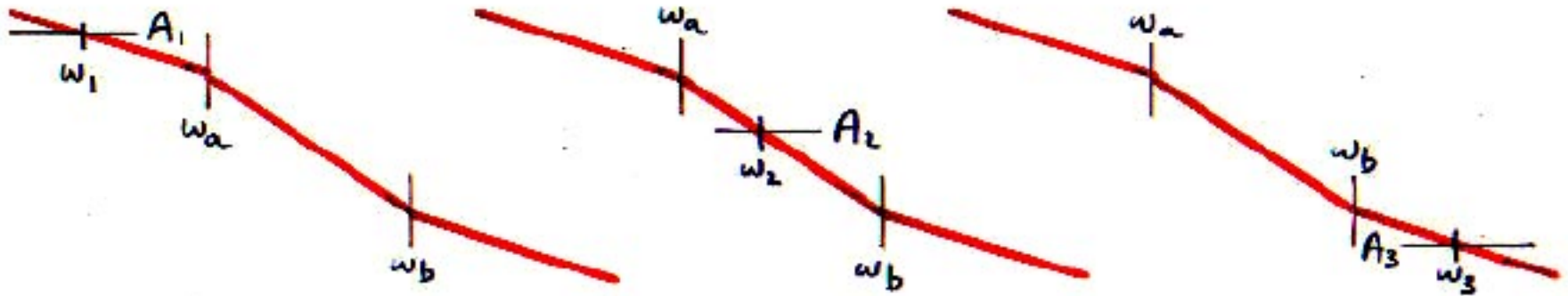
Identify the gain at any chosen frequency as "reference" gain



Exercise:

No flat gain

Identify the gain at any chosen frequency as "reference" gain



$$A = A_1 \frac{w_1}{s} \frac{1 + \frac{s}{w_b}}{1 + \frac{s}{w_a}}$$

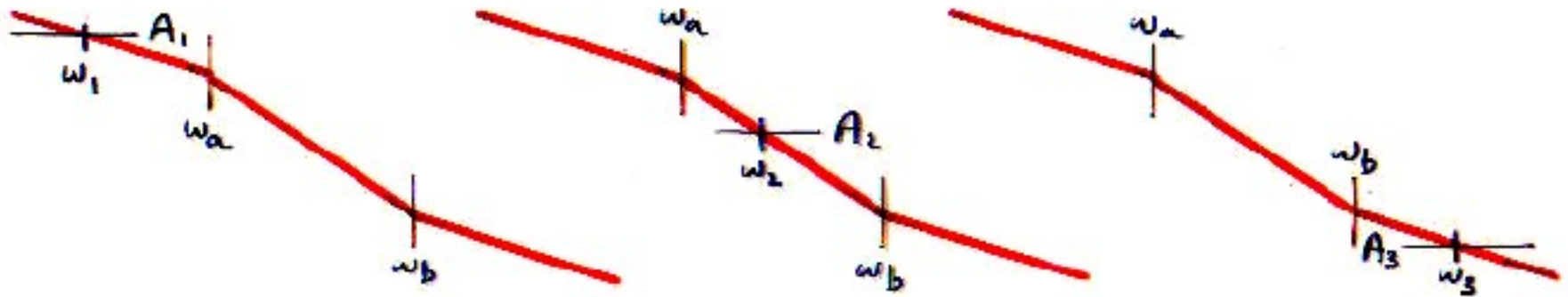
$$A = A_2 \left(\frac{w_2}{s}\right)^2 \frac{1 + \frac{s}{w_b}}{1 + \frac{s}{w_a}}$$

$$A = A_3 \frac{w_3}{s} \frac{1 + \frac{w_b}{s}}{1 + \frac{w_a}{s}}$$

Exercise:

No flat gain

Identify the gain at any chosen frequency as "reference" gain



$$A = A_1 \frac{\omega_1}{s} \frac{1 + \frac{s}{\omega_b}}{1 + \frac{s}{\omega_a}}$$

$$A = A_2 \left(\frac{\omega_2}{s}\right)^2 \frac{1 + \frac{s}{\omega_b}}{1 + \frac{\omega_a}{s}}$$

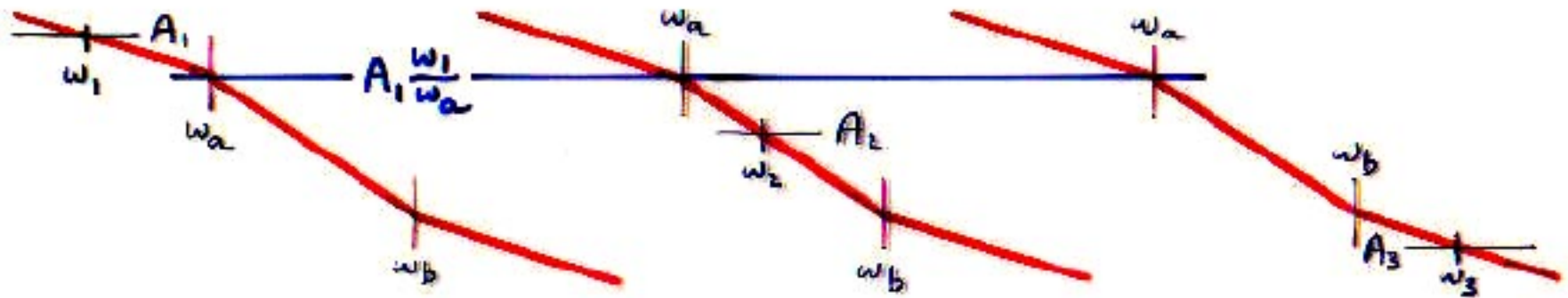
$$A = A_3 \frac{\omega_3}{s} \frac{1 + \frac{\omega_b}{s}}{1 + \frac{\omega_a}{s}}$$

Exercise: Express A_2 and A_3 in terms of A_1 .

Exercise:

No flat gain

I identify the gain at any chosen frequency as "reference" gain



$$A = A_1 \frac{\omega_1}{s} \frac{1 + \frac{s}{\omega_b}}{1 + \frac{s}{\omega_a}}$$

$$A = A_2 \left(\frac{\omega_2}{s}\right)^2 \frac{1 + \frac{s}{\omega_b}}{1 + \frac{s}{\omega_a}}$$

$$A = A_3 \frac{\omega_3}{s} \frac{1 + \frac{s}{\omega_b}}{1 + \frac{s}{\omega_a}}$$

Exercise: Express A_2 and A_3 in terms of A_1 .

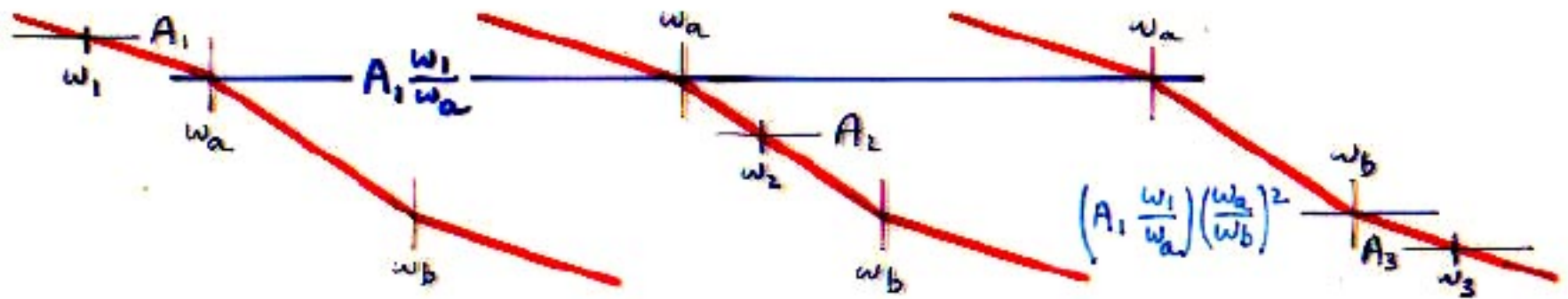
$$A_2 = \left(A_1 \frac{\omega_1}{\omega_a}\right) \left(\frac{\omega_a}{\omega_2}\right)^2$$

$$= A_1 \frac{\omega_1 \omega_a}{\omega_2^2}$$

Exercise:

No flat gain

I identify the gain at any chosen frequency as "reference" gain



$$A = A_1 \frac{w_1}{s} \frac{1 + \frac{s}{w_b}}{1 + \frac{s}{w_a}}$$

$$A = A_2 \left(\frac{w_2}{s}\right)^2 \frac{1 + \frac{s}{w_b}}{1 + \frac{s}{w_a}}$$

$$A = A_3 \frac{w_3}{s} \frac{1 + \frac{s}{w_b}}{1 + \frac{s}{w_a}}$$

Exercise: Express A_2 and A_3 in terms of A_1 .

$$\begin{aligned} A_2 &= \left(A_1 \frac{w_1}{w_a}\right) \left(\frac{w_a}{w_2}\right)^2 \\ &= A_1 \frac{w_1 w_a}{w_2^2} \end{aligned}$$

$$\begin{aligned} A_3 &= \left[\left(A_1 \frac{w_1}{w_a}\right) \left(\frac{w_a}{w_b}\right)^2\right] \frac{w_b}{w_3} \\ &= A_1 \frac{w_1 w_a}{w_3 w_b} \end{aligned}$$