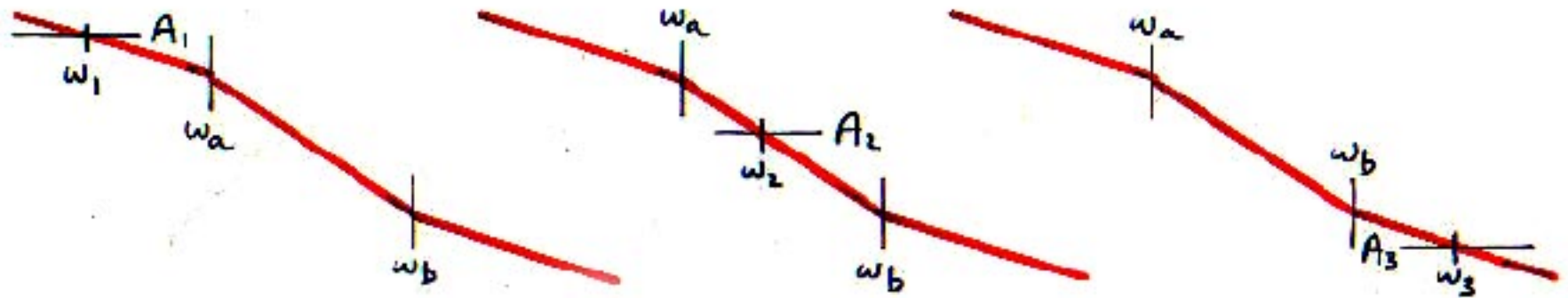# EXERCISE 3.1

SOLUTION

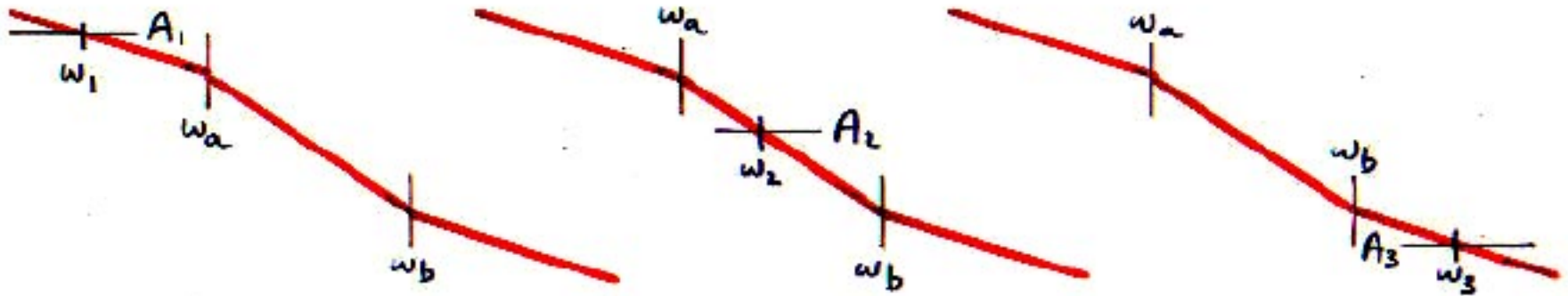Exercise:
  No flat gain
      Identify the gain at any chosen frequency as "reference" gain

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$$A = A_1 \frac{W_1}{S} \frac{1 + \frac{S}{w_b}}{1 + \frac{S}{w_a}}$$

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

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

Exercise:

No flat gain

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

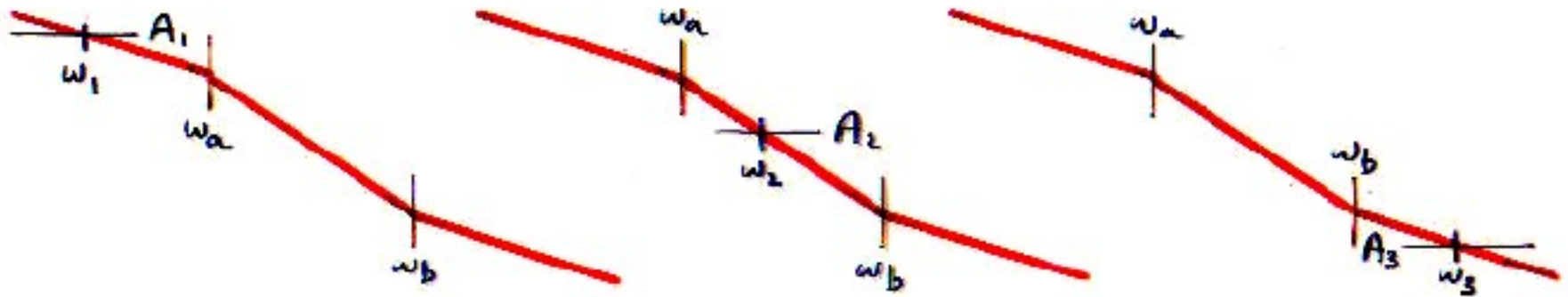$$A = A_1 \frac{w_1}{s} \frac{1 + \frac{s}{w_b}}{1 + \frac{s}{w_a}} \qquad A = A_2 \left(\frac{w_2}{s}\right)^2 \frac{1 + \frac{s}{w_b}}{1 + \frac{w_a}{s}} \qquad A = A_3 \frac{w_3}{s} \frac{1 + \frac{w_b}{s}}{1 + \frac{w_a}{s}}$$
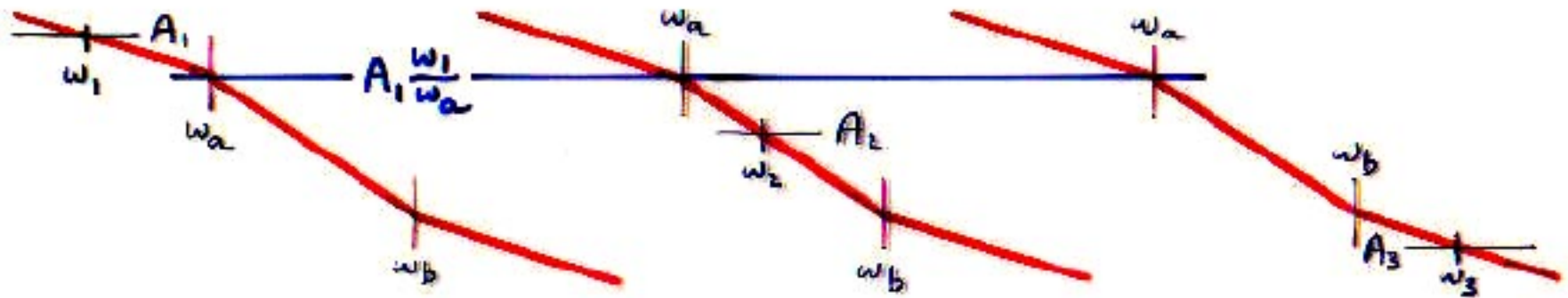
Exercise: Express A_2 and A_3 in terms of A_1.

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Exercise: Express A_2 and A_3 in terms of A_1.

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

$$= A_1 \frac{w_1 w_a}{w_2^2}$$

Exercise:

No flat gain
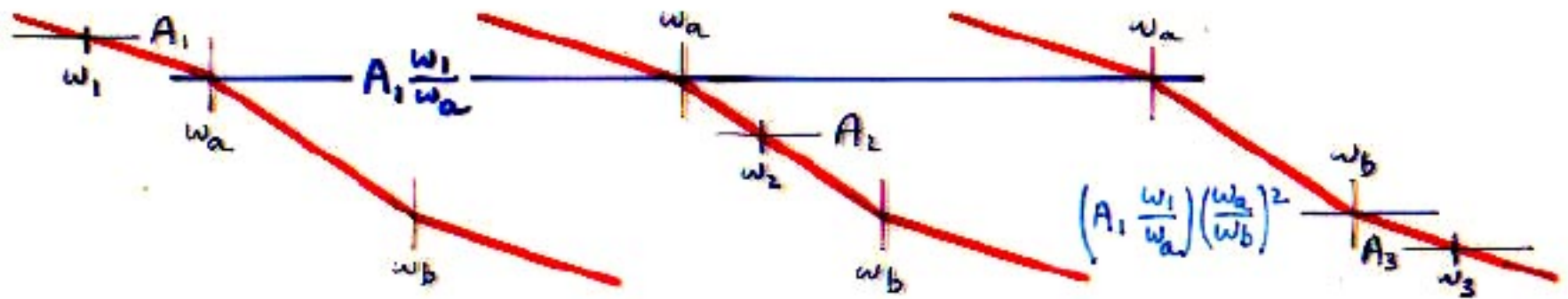
Identify the gain at any chosen frequency as "reference" gain

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

Exercise: Express A_2 and A_3 in terms of A_1.

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

$$= A_1 \frac{w_1 w_a}{w_2^2}$$

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

$$= A_1 \frac{w_1 w_a}{w_3 w_b}$$