

47.5

Dane

$$f_1' = 4250 \text{ Hz}$$

$$f_2' = 3778 \text{ Hz}$$

$$v = 340 \frac{\text{m}}{\text{s}}$$

Frage

a) $v_2 = ?$

b) $f = ?$

$$f' = f \cdot \frac{v \pm v_0}{v \pm v_2}$$

$$f_1' = f \cdot \frac{v}{v - v_2} \quad , \quad f_2' = f \cdot \frac{v}{v + v_2}$$

$$\left\{ \begin{aligned} f_1' &= f \cdot \frac{v}{v - v_2} \\ f_2' &= f \cdot \frac{v}{v + v_2} \end{aligned} \right.$$

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$$\left\{ \begin{aligned} 4250 &= f \cdot \frac{340}{340 - v_2} \quad / \cdot (340 - v_2) \\ 3778 &= f \cdot \frac{340}{340 + v_2} \quad / \cdot (340 + v_2) \end{aligned} \right.$$

$$\left\{ \begin{aligned} 4250 \cdot (340 - v_2) &= f \cdot 340 \\ 3778 \cdot (340 + v_2) &= f \cdot 340 \end{aligned} \right.$$

$$\left\{ \begin{aligned} 1445000 - 4250v_2 &= 340f \\ 1284520 + 3778v_2 &= 340f \end{aligned} \right.$$

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$$+ \left\{ \begin{aligned} -1445000 + 4250v_2 &= -340f \\ 1284520 + 3778v_2 &= 340f \end{aligned} \right.$$

$$\underline{1284520 + 3778v_2 = 340f}$$

$$-160480 + 8028v_2 = 0 \quad / +160480$$

$$8028v_2 = 160480 \quad / : 8028$$

$$v_2 = 19,99003488$$

$$v_2 \approx 20$$

$$4250 = f \cdot \frac{340}{340 - 20}$$

$$4250 = f \cdot \frac{340}{320} \quad / \cdot 320$$

$$1360000 = f \cdot 340 \quad / : 340$$

$$4000 = f$$

$$f = 4000$$

a) $v_2 \approx 20 \frac{\text{m}}{\text{s}}$

b) $f = 4000 \text{ Hz}$