

$$f_0 = f_s \left(\frac{1}{1 - v_s/v} \right)$$

$$f_0 = f_s \left(\frac{1}{1 + v_s/v} \right)$$

$$f_s \left(\frac{1}{1 - v_s/v} \right) = f_s \left(\frac{1}{1 + v_s/v} \right)$$

$$1022 \left(\frac{1}{1 - v_s/v} \right) = 981 \left(\frac{1}{1 + v_s/v} \right)$$

$$1022 \left(\frac{1}{1 - v_s/343} \right) = 981 \left(\frac{1}{1 + v_s/343} \right)$$

$$\frac{1022}{981} = \frac{\left(\frac{1}{1 + v_s/343} \right)}{\left(\frac{1}{1 - v_s/343} \right)}$$

$$v_s = 7.02 \text{ m/s}$$

$$v_s' = 15 \text{ m/s} + 7 \text{ m/s} = 22 \text{ m/s}$$