

48. The Doppler effect formula, Eq. 18-47, and its accompanying rule for choosing \pm signs, are discussed in §18-8. Using that notation, we have $v = 343$ m/s, $v_D = 2.44$ m/s, $f' = 1590$ Hz and $f = 1600$ Hz. Thus,

$$f' = f \left(\frac{v + v_D}{v + v_S} \right) \implies v_S = \frac{f}{f'} (v + v_D) - v = 4.61 \text{ m/s} .$$