

50. The Doppler effect formula, Eq. 17-47, and its accompanying rule for choosing \pm signs, are discussed in §17-10. Using that notation, we have $v = 343$ m/s,

$$v_D = v_S = 160000/3600 = 44.4 \text{ m/s},$$

and $f = 500$ Hz. Thus,

$$f' = (500 \text{ Hz}) \left(\frac{343 - 44.4}{343 - 44.4} \right) = 500 \text{ Hz} \Rightarrow \Delta f = 0.$$