Ex. 14.5 # 20, 21, 13 p 437

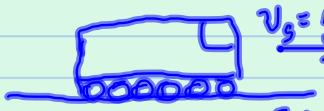
$f' = f\left(\frac{v + v_o}{v}\right)$ observer in motion — add on top

$f' = f\left(\frac{v}{v - v_s}\right)$ source in motion — subtract on btm

$f' = f\left(\frac{v + v_o}{v - v_s}\right)$ both in motion

(−) v if going away
+ v if coming towards

p 438



f′ $v_o = 0 \frac{m}{s}$

$f' = f\left(\frac{v}{v - v_s}\right) = 500\left(\frac{345}{345 - 40}\right)$

$= 566$ Hz

how do w/ train going away $-40 \frac{m}{s}$

$f' = 500\left(\frac{345}{345 - 40}\right) = 448$ Hz

Doppler

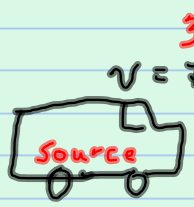
source moves closer
f sounds like ↑

moves away
f sounds like ↓

v sound 345 m/s
v_o observer
v_s source

use $v = 345 \frac{m}{s}$

14.6



$v = 75 \frac{mi}{h} \rightarrow$ $33.5 \frac{m}{s}$

$f = 400 Hz$

$\leftarrow v$ $55 \frac{mi}{h}$ $24.6 \frac{m}{s}$

obs.

car towards $f' = f\left(\frac{v + v_o}{v - v_s}\right)$

$= 400\left(\frac{345 + 24.6}{345 - 33.5}\right) = 475 Hz$

car away $f' = f\left(\frac{345 + \overset{-}{24.6}}{345 \underset{+}{(-)} 33.5}\right) = 339 Hz$