Problem 1: Nonrelativistic Doppler Shift, Source and Observer in Motion (15 points)

Consider the situation where the source is moving toward an observer. The speed of the source is a.

\[ v \] and the observer is stationary. Let the frequency of the source be

\[ f_s \].

\[ \text{Problem 2: The Transverse Doppler Shift (5 points)} \]

Consider the Doppler effect observed by a stationary observer. Now the source is

\[ v \] and the observer is in motion with speed \[ v_o \] relative to the source. Let the speed of the source be

\[ v_s \].

\[ \text{Problem Set 1, Fall 2020} \]

Massachusetts Institute of Technology

Reading Assignment: The First Three Minutes, Chapters 1 and 2

Due Date: Friday, September 11, 2020
Total points for Problem Set 1: 40. Plus 15 points of extra credit.

(a) In the relativity situation, where the wave is light and the speed a may be computed.

(b) The car is approaching.

(c) The ears of the observer hear sound from the car in front of it; the car in front of it; the car behind it; and

(d) If we were in question a sound and both the source speed a and the wave speed v.

Problem 3: A HIGH-SPEED GO-ROUND