UNIVERSITY OF MIAMI
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ENGINEERING ACOUSTICS

Homework No.2

1. Calculate the speed of sound in the following gaseous situation: H_2, air + 25% H_2, air + 50% H_2, CO_2, air + 5% CO_2, air + 10% CO_2, SO_2, air + 5% SO_2, air + 5% CO_2 + 5%SO_2, He. Tabulate the results for temperatures of 0 F, 0 C, 20 C, 100 F.

2. A small source is emitting sound in air in free field conditions. At 10 m the wave propagation is assumed planar and the sound pressure level (SPL) is measured to be at $L_p = 60$ dB. Compute the sound intensity level, L_I, at the listening location. Compute the sound power level, L_w, and the sound power, P, of the source. Assign proper units to the quantities.

3. The steady state noise associated with an exposed, 200 m straight line segment of a busy highway was measured at a distance of 5 m to be at SLP = 100 dB.

    a. Determine the sound power level, L_w, and the sound power, P, associated with the highway noise source.
    b. Let the required human hearing comfort level be at SPL = 65 dB. Determine the minimum distance from the highway that would guarantee that a residential area on a hill overlooking the highway would not receive highway noise in excess of the set comfort level. Assume fully reflective ground (hemispheric radiation model.) Plot the measured SPL level as a function of distance.