TT3010 - Audio technology and room acoustics.
Exercise 2 - Room acoustics.

September 13, 2021

All tasks are reproduced from chapter 24 in "Science of Sound". Tasks marked *Mandatory* must be handed in for approval (online). The deadline is specified in blackboard.

Tasks

1. *Mandatory.* Calculate the frequencies of the first three resonances of a room with dimensions 5 m $\times$ 10 m $\times$ 2.5 m. Do they have any significance acoustically?

2. *Mandatory.* From the chart given in figure 1, determine the distance from a loudspeaker with $Q = 5$ in a room with $A = 500$ at which direct and reverberant sound are equal in level. (Hints: a) you can use the equation 24.2 of the book, b) $L_p - L_W$ should be 3 dB above the reverberant level.)

3. *Mandatory.* We will now focus on the room described in Task 1. Indicate the location of the maximum sound pressure level when the room is excited in each of its first three resonances.

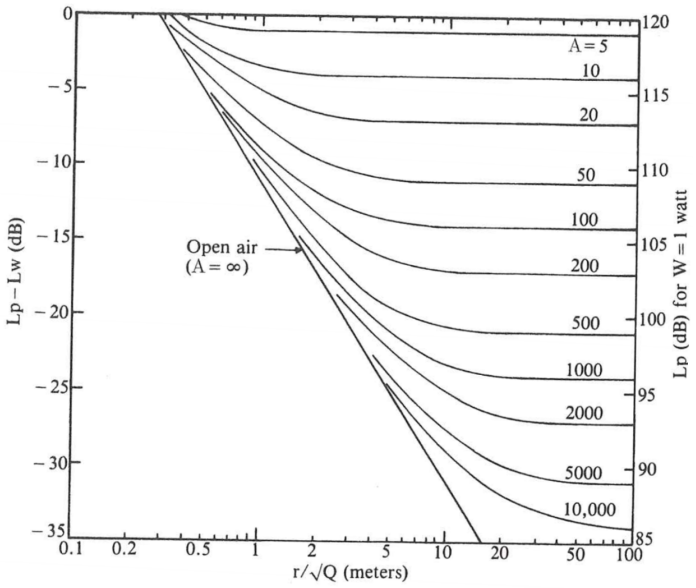

FIGURE 24.2
Chart for determining sound pressure level L_p in a room, where r is the distance from the source, Q is the directivity of the source, W is its power, L_w is its sound power level, and A is the total absorption (in m^2).

Figure 1: Illustration from "Science of Sound", chap 24.