EE417 Fall 2008
Homework #2
Assigned Monday, October 13, 2008
Due at the start of class on Monday, October 20, 2008

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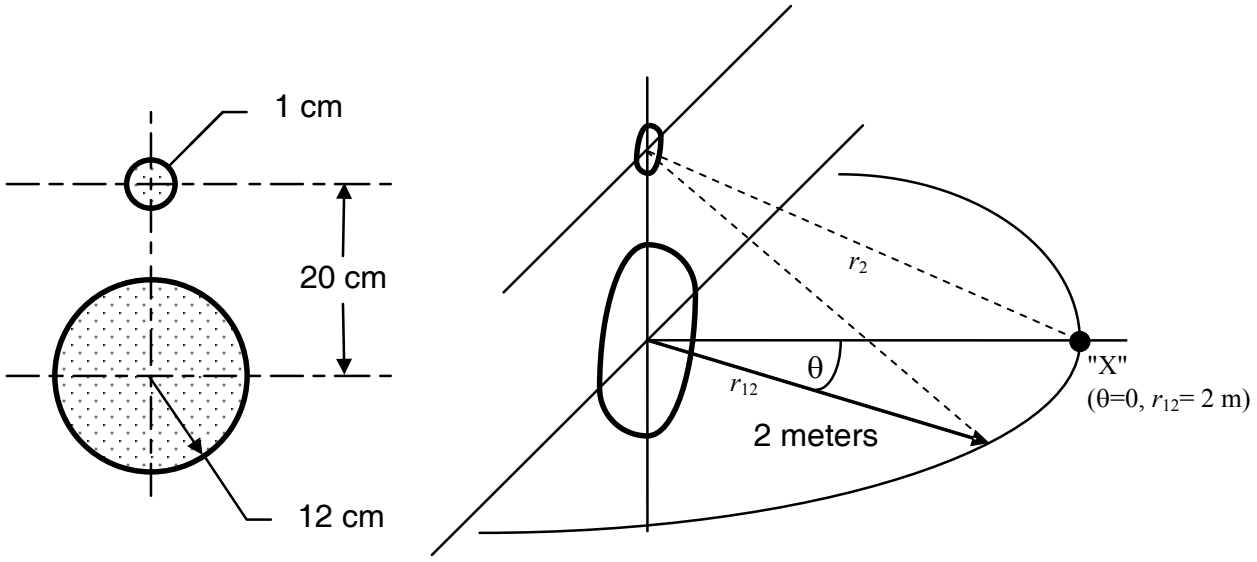
(1) From the K&F textbook: **7.1.4**

(2) From the K&F textbook: **7.6.6**

(3) A loudspeaker system with two drivers is described by the following geometry:



Front View *Oblique View*

Each driver is modeled as a baffled piston radiator (far field case, K&F §7.4b, pp. 181-184). Both drivers are operated at **f = 5 kHz** into air at 20°C.

The receiver position "X" is in the plane of the 12 cm radius driver at a distance of 2 meters from the center of that driver. Use the far field pressure relationship (eqn. 7.4.17).

(a) When the 1 cm radius driver is operated *alone*, the SPL measured for θ = 0° at "X" is found to be 100 dB re 20μPa. When the 12 cm radius driver is operated *alone*, the SPL at "X" is also measured to be 100 dB re 20 μPa. Determine the speed amplitude (U_o) and the displacement amplitude of each driver.

(b) Under the same operating conditions, determine and plot the pressure amplitude *in the plane of the 12 cm driver's principal axis* as a function of the angle θ for each of the drivers acting alone. MATLAB would be a useful way to do this. Comment on the results.

(c) Finally, calculate the far field pressure amplitude as a function of θ when the two drivers operate in phase at the same time. Comment on the results.