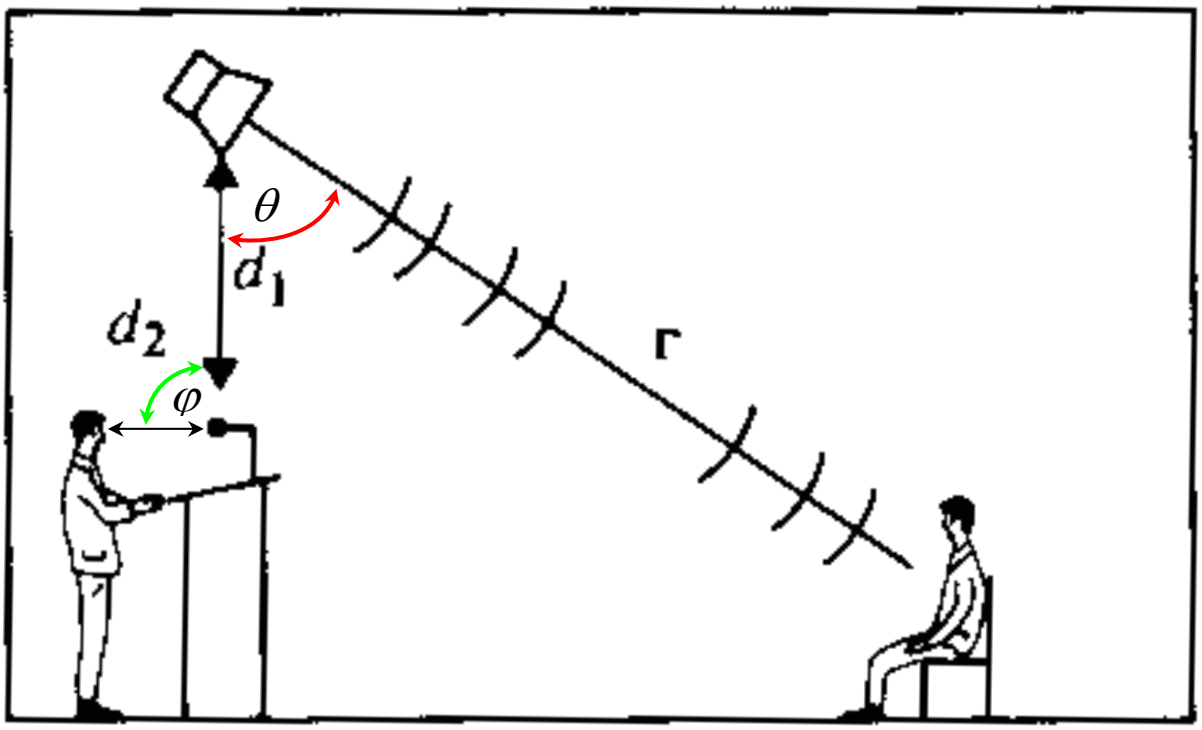
Microphone Placement to Eliminate/Suppress Acoustic Feedback:

The SPL formulae we have been using above can also be used to determine maximum allowable SPL's from an electronic sound reinforcement system that will avoid microphone feedback problems in a room/auditorium, as well as optimum placement of microphones. The figure shown below shows a typical setup for microphone use in a room/auditorium, with an overhead speaker used for sound reinforcement, *e.g.* to help listeners in the back of the room.



As can be seen from the figure, r = distance (m) from loudspeaker to listener, d_1 = distance (m) from loudspeaker to microphone, d_2 = distance (m) from the human speaker to microphone, θ = angle of the off-axis direct sound from speaker, at the microphone. $G_{spkr}(\theta)$ is angular factor (only) associated with the *SPL* reduction (in *dB*) of the off-axis direct sound from the speaker at an angle θ, at the microphone, *e.g.* obtained from polar-plot response curves, similar to those shown above, on page 11 of these lecture notes. Similarly, an angular factor $F_{mic}(\varphi = 90^{o})$ is an angular factor (only) associated with the *SPL* reduction (in *dB*) of the off-axis response of the microphone to the direct sound from the speaker, here at an angle $\varphi = 90^{o}$ with respect to the microphone axis, as shown in the figure above. The angular factor $F_{mic}(\varphi)$ can be obtained from the microphone's polar-plot response curves, similar to those shown above, on pages 24-25 of these lecture notes.