Subject: Constrained spatial loading
Posted by Adrian Mack on Mon, 26 Jan 2004 15:14:54 GMT
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Hey Wayne,Been looking over your post "Room Corner Characteristics" today. Where it says, "Expansion from corner, starting at the the wall-wall junction and moving horizontally into the room up to 8 feet" does it mean, when the person walks away up to 8feet away from the corner, or is it a table showing what happens when the ceiling is from 1 to 8 feet high? Or is it a table showing what happens for wavelengths up to 8 feet ("For wavelengths shorter than 8 feet, the ceiling is a reflector and not a source launch boundary."). Where it shows the increasing directivity with decreasing freq, it looks like that by 30Hz the equivalent pyramidal horn flare angle would be very small, something like 10 degrees! Does it mean the greater than 1/8th space loading is then limited to a 10degree angle by 30Hz? Or does it just represent the increase in SPL because of increasing directivity, at all area's within the wall's 90degree flare? What happens to directivity when wavelength is longer than the longest room dimension? Can the walls on the other side of the room contribute as part of the flare or making a more constrained condition? Is it +3db gain with every doubling of increase in spatial condition? eg: 1/4th to 1/8th space, 1/8th space to 1/16th space, etc.At this website, The placement of one or several subwoofers it says that the reflections off a boundry will be in phase with the direct radiation when the driver in the subwoofer is placed within 1/8 wavelength from the boundry. It talks about it in terms of reflections though, though the wall is not a reflector at low frequencies. I guess I'm trying to see how much of a contribution 1/16th space will be to a basshorn, and also approximate what frequency the transition is for a given size room, and also what happens to dispersion after reading your other post. What do you think? Thanks!Adrian

Subject: Re: Constrained spatial loading
Posted by Wayne Parham on Tue, 27 Jan 2004 02:19:00 GMT
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If a room's ceiling is eight feet high, then the expansion from the apex of the corner at the floor-wall-wall junction is purely conical for eight feet. At that point, another boundary is encountered - The ceiling makes the expansion become more like a parabola.The thing is, that doesn't really matter too much because the walls don't set directivity below the Schroeder frequency. Room modes set in and they form pockets of energy, making any talk of the directivity set by expansion sort of meaningless at very low frequency. The Schroeder frequency is about 100Hz to 150Hz in most rooms, so you can generally expect the corner to provide constant directivity down to that point. Below that, the locations of standing wave modes set the energy distribution in the room.The Schroeder frequency marks the approaximate frequency where sound transitions from behaviing as a reverberent field to having discrete modes. Above the Schroeder frequency, modes are so closely spaced they're indistinguishable and sound can be thought of statistically, as a balanced field. Below that, discrete modes form that have fairly well defined boundaries. You can find hot and cold spots in the room, places where certain frequencies are strong and other places where they're weak. You can model the energy distribution in the room with an FEA program, or measure it with an array of measurements made on a grid.If the corner

expansion were to go on indefinitely, or even if it didn't but the ceiling and opposing space were open, then the wall angle could set directivity down to a very low frequency. Even if the room is not open but is very large, this can happen. In that case, the Schroeder frequency is low, so directivity can be maintained down to a low frequency. In some large indoor spaces, the Schroeder frequeency is below the passband, so the room acts something an outdoors space. Of course, when you get near a boundary, that boundary has an influence but the opposing boundaris are far enough away that they don't create room modes in the passband. In that case, a speaker placed at the corner apex of the room will have constant directivity even at low frequencies. The walls set the pattern, in this case.

Subject: Re: Constrained spatial loading
Posted by Adrian Mack on Tue, 27 Jan 2004 08:51:40 GMT
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Hey WayneWhats the difference between FEA and FEM?Could these plots that sheerin did tell anything?http://ldsg.snippets.org/HORNS/basshornfea.htmlI'm not sure what those different colours mean. Seems like in the corner, its all red, then turns blue for most of the rest of the room.

Subject: Re: Constrained spatial loading
Posted by Wayne Parham on Tue, 27 Jan 2004 08:56:31 GMT
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FEA and FEM are the same thing - Finite Element Analysis / Method.
