Subject: Tractoid Horn Beaming
Posted by Dean Kukral on Sat, 24 Jan 2004 21:04:07 GMT
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Why should tractoid horns (round, formed by revolving a tractrix on its axis) have low dispersion? (See Shanko's posts on Oct. 15, 2003)Suppose a tractoid horn is flush-mounted to an infinite baffle. And suppose spherical sound waves travel down the horn. Then, when they leave the horn, they should be hemispherical in shape and omnidirectional. In fact, they should disperse perfectly in all directions. See the "orthogonal to circles" diagram at,www.xahlee.org/SpecialPlaneCurves_dir/Tractrix_dir/tractrix.htmlThe only flies in the ointment that I understand are,1) The compression driver may not produce spherical waves, so the value of the tractoid geometry is negated (why, then, load this driver with a tractoid??), or2) The geometry of the tractoid, along with the laws of fluid dynamics, does not maintain the spherical shape of the sound waves as they travel down the horn, so they leave the horn focused. (Again, then, why use a tractoid?)3) The absence of the infinite baffle completely mucks up everthing. (Same question.)4) Perhaps the Oris horns do not flare out to their asymtotic ends; but this would not explain the issue for other tractoids or "tractrix horns."Can someone explain why these would beam?

Subject: Re: Tractoid Horn Beaming
Posted by Wayne Parham on Sun, 25 Jan 2004 00:00:00 GMT
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Directionality of a curved-wall horn changes with frequency. That's why horns like this have narrow dispersion at high frequencies. The pattern is wide at low frequencies, but narrows as frequency goes up.

Subject: Re: Tractoid Horn Beaming
Posted by Dean Kukral on Sun, 25 Jan 2004 12:35:08 GMT
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Thanks, Wayne. I gues that my mental image of what is physically going on at the boundary is incorrect. I'll have to sit down with a pencil and paper and think about it a bit.Is there a good, modern book on Acoustics where one can study these things? I bought Collom's "High Performance Loudspeakers," but it has been little help so far. Maybe I need to read more of it...

Subject: Re: Tractoid Horn Beaming

Posted by Wayne Parham on Sun, 25 Jan 2004 13:24:37 GMT
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A few good books to have are "Introduction to Electroacoustics and Audio Amplifier Design," by Marshall Leach, "Acoustics" by Leo Beranek and "Elements of Acoustical Engineering" by Harry Olson. But here are some references you can download to get you started. Check out George Augspurger's "Sound System Design Reference Manual." Chapter 3 is about directionality, and it touches on the subject of narrowing directivity. Polar plots are used to illustrate coverage at various frequencies. Also see the AES paper called "Improvements in Monitor Loudspeaker Systems," by David Smith, Don Keele and John Eargle. It discusses directivity as well.

Subject: Thanks, Wayne (nt)
Posted by Dean Kukral on Sun, 25 Jan 2004 13:33:04 GMT
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Thanks

Subject: Leach's Book
Posted by Dean Kukral on Tue, 27 Jan 2004 19:11:49 GMT
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I checked on Amazon, and these books seemed to be out of print, but a good review of Leach's book was listed. After a Google search on Leach's book, I found the web site at Georgia Wreck for his class. Seems that he just released a new edition and had a link to the publisher.I called the publisher (Customer Service) this morning, and they have the book and are sending me one to arrive in a few days (from Iowa). $60 plus tax plus shipping. (About $72 for me.)Thought that I would pass this along in case anyone else is interested. They say that the book uses math. thru calculus plus complex numbers.Leach also has a link to errata for all the editions, so if anyone here has an earlier version and wants the corrections, they are there.