

Re: Sine wave construction using calculus or some approximation thereof – question.

Re: Sine wave construction using calculus or some approximation thereof – question.

Source: <http://sci.tech-archive.net/Archive/sci.math/2006-02/msg02856.html>

- *From:* israel@xxxxxxxxxxx (Robert Israel)
 - *Date:* 16 Feb 2006 21:58:02 GMT
-

In article <1140111842.413925.15850@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, jhuie <jhuie@xxxxxxxxxxx> wrote:

Interesting. I've been looking at some of the examples and it's fascinating. The main reason I've been curious is because I thought you could make up a function from a series of smaller (lower amplitude) waves. But I'm not sure that's true by looking at the examples.

In terms of an example, say you had 1,000 tiny speakers. Could you somehow arrange those and control them with a computer so that they "add up" to create the sound of one large speaker? Could you somehow approximate a very low note from a combination of speakers that individually can only produce high notes? See where I'm going with this?

I'm confused about what you're asking. Is the issue amplitude or frequency? If it's amplitude, then yes, the sum of a bunch of functions $a_n \sin(\omega t)$ is $(\text{sum of the } a_n) \sin(\omega t)$. You can make a large-amplitude wave from a lot of small-amplitude waves of the same frequency. If it's frequency, then no, you can't add a bunch of high notes to get a low note. However, you can run the sum through a nonlinear process to get a low note. That's exactly what your AM radio does, taking a radio-frequency input and extracting an audio-frequency output.

Robert Israel israel@xxxxxxxxxxx
Department of Mathematics <http://www.math.ubc.ca/~israel>
University of British Columbia Vancouver, BC, Canada