Re: Calc. energy harmonics

Source: http://sci.tech−archive.net/Archive/sci.physics/2007−11/msg00899.html

- *From*: "hhc314@xxxxxxxxx" <hhc314@xxxxxxxxx>
- *Date*: Mon, 12 Nov 2007 13:52:23 −0800

On Nov 11, 11:40 pm, Jim Slatter <jimslat...@xxxxxxxxxxxxx> wrote:

> > > For example, an RF fundamental and the
> > > frequency obtained by dividing
> > > it in successively in two 20 or 30 times.
> > >
> > > Thank you,
> > >
> > > Jim Slatter
> >
> > Wouldn't that depend on the shape of the waveform?
>
> Indeed it does. Pure sine waves, for example, have no harmonics. A distorted sine wave has harmonics proportional to the percentage of distortion.
>
> Harry C.

I am referring to a "resonant" frequency irrespective of waveform.
Here is a specific example. I have two separate signals of equal amplitude. One is a 1GHz sinewave, the other is 1GHz divided by 2 twenty times to produce a distant lower octave.

How do I calculate the _proportion_ of energy density of the distant octave compared to that of the fundamental, assuming all else is equal?

Jim Slatter

Jim, if you have no harmonics, meaning that you are dealing with perfect sine waves at their fundamental frequenceis, the result is found of combining these two frequencies is found in very old and classic modulation theory generally described in texts on modulation theory. . Energy density is comparar,ed in proption to the energy power db ratio of the two signals. This is very basic EE comunications technology so there is little need to complicate it. The energy density ratio is simply equal to the power density radio of the two signals, which are normally compared in terns if the db content.

I agree that this can be confusing to the non−engineer/scientist, but it it actually a rather trivial concept once digested. Still first, you have to grasp the difference between dbs expessed as 10 log v1/v2, and those expessed as 20 log P1/P2. Once you grasp this, the rest become trivial.

When you get into harmonics, things become much more complex, but you first have to realize that a pure sine wave has no harmonics.

EE's know this, and so do physicists. It' basic knowledge.

So long as you are dealing with pure sine wave sources, the solution becomes trivial. When you delve into distorted sine waves, the solution becomes much more complex..and accordingly more interesting.

I personally like to play with pipe organ design, where except for a perfect flute pipe (whose sound I find as boring as listening to the amplified output of my amplified Genrad audio oscillator), and hence love the complex harmonic relationship that exists withing a full chorus of diapasons (who's output is anything but sine waves.) is to me incredible. You've heard it, and I can only describe it as a somewhat "granular sound", which is very difficult to electronically duplicate.

Ok, that gets into entirely different material, which can consume hours of endless discussion...between musicians and physicists.

If you want to discuss this person to person, my email is actually hhc3141@xxxxxxxxxx Not the email address that I post under.

Harry C.

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