Re: Fourier analysis Q

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- *From*: glhansen@xxxxxxxxxxxxxxxxxxxx (Gregory L. Hansen)
- *Date*: Thu, 3 Nov 2005 15:52:33 +0000 (UTC)

In article <dkdb93ohb1@xxxxxxxxxxxxxxxxx>,
bill <please_post@xxxxxxxxxx> wrote:
>
>
>
>I have some data that, when I histogram it, shows some degree of
>quantization (i.e. the histogram has definite spikes at regular
>intervals, and this is not an artifact of the histogramming
>procedure). The spikes decay in magnitude roughly exponentially.
>(In between the spikes the hits are few but not zero.)
>
>I don't know much about Fourier analysis, but it seems to me that
>I should be able to apply some type of Fourier technique to this
>data to measure the quantification more precisely, and in a way
>that is not at all affected by the arbitrary choices made in making
>the histogram.
>
>What throws me off is that, in my little experience with Fourier
>analysis, all the techniques are applied to a "signal" relative to
>some variable (usually time). In this case all I have is a list
>of about 100,000 non−negative numbers, which, when histogrammed,
>appear to bunch up at regular intervals. Something *similar* to
>
>126.380819738467
>126.283380093841
>125.748352912939
>42.4897817871943
>168.131819727191
>168.163828641399
>41.769198680611
>0.0370432374476124
>83.828042075852
>42.2004219487581
>42.1663080612675
>167.85268740098
>84.1654003775314
>126.075822588658
>41.6125736396355
>

>where all the numbers are close to a multiple of 42 (actually the
>periodicity become less obvious as the magnitude of the numbers
>increases).
>
>Given that this is nothing like a time−dependent (or space−dependent)
>signal, I'm a bit of at a loss as to how to apply a Fourier
>transformation to the data.
>
>Any suggestions would be much appreciated!
>
>bill

You really need to start by knowing which questions you want answered. The horizontal axis has to be SOMETHING, or else you might just as well plot the data in any random order. Fourier analysis will represent the data in terms of frequencies. Does that make sense? Does that give you some insight into the system you're studying? If spikes are clearly visible, you might be better just looking at the average period between them. If you're interested in the decay, you might be better off fitting a decay curve to each one to find a decay time constant. Or trying randomness tests.
−−
"We need to remember that when we are faced with an unstructured problem
it is we who create the model in the form of a quantitative metaphor;
there is no correct model waiting in the wings for us to call onstage." −−
Thomas L. Saaty, "Mathematical Methods of Operations Research" (1988)
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- ***References***:
  - ♦ ***Fourier analysis Q***
    - ◊ *From:* bill

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