Re: 4 real periods

Source: http://sci.tech−archive.net/Archive/sci.math/2007−09/msg04777.html

- *From*: hagman <google@xxxxxxxxxxxxx>
- *Date*: Fri, 21 Sep 2007 13:13:47 −0700

On 21 Sep., 20:59, tommy1729 <tommy1...@xxxxxxxxx> wrote:

> david wrote:
>
>> On Thu, 20 Sep 2007 16:54:44 EDT, tommy1729
>> <tommy1...@xxxxxxxxx>
>> wrote:
>>
>>> David C Ullrich wrote
>>>
>>>> On Wed, 19 Sep 2007 09:35:05 EDT,
>>>> tommy1729
>>>> <tommy1...@xxxxxxxxx>
>>>> wrote:
>>>>
>>>>> consider the
>>>>> set of
>>>>> functions R
>>>>> −> R
>>>>> with
>>>>> F(x) = A +
>>>>> B + C + D
>>>>>
>>>>> where A , B
>>>>> , C , D have
>>>>> 4 real
>>>>> periods and
>>>>
>>>> satisfy R
>>>>
>>>>> −> R

A = a_0 +
a_1 sin(P_1
x) + a_2
sin(2 * P_1
x) +

a_3

...
+ A_1
cos(P_1 x)
+ A_2 cos(2
* P_1 x) +
A_3
x) + A_3 ...

B = b_0 +
b_1 sin(P_2
x) + b_2
sin(2 * P_2
x) +

b_3

...
+ B_1
cos(P_2 x)
+ B_2 cos(2
* P_2 x) +
B_3
x) + B_3 ...

ETC (real
fourier
series)

1) given a
function
G(x) R ->
R, how do
we

decide

if

it belongs to this set ?

2) how do we find the 4 real periods P_1, P_2,

P_3

and P_4 ?

3) how do we find the coefficients of A B C and

D

?

(*)

(*) knowing the answer to 2 questions also

solves

the

3rd.

(note: of course G(x) is not given as the sum

fourier
series nor
are its
periods
given in

advance)

regards
tommy1729

well ? where are the
calculus experts now ?

The calculus experts are pretty certain that
since
you insist on spouting nonsense about utterly
elementary
topics in complex analysis there's very little

point

in trying to explain the theory of

"almost−periodic

functions" to you.

dont speak for others David.

what you really want to say is you dont understand

it either hmm

spouting nonsense like integral x dx = 2x + 1 oh no , wait thats your equation.

you are a very strange "prof" David.

1) you wrote integral x dx = 2x + 1 for example

(there are similar "math demonstrations")

but hey lets disregard that ,

2) when the questions become hard , you ignore the

thread or you say it is trivial...

3) ... without solving it !!!

seems like you cant do the math , or you are not

very good at helping people with it.

you even refuse to give a decent answer.

if you cant do math or you refuse to help people

with math , that makes you a very "special type" of prof.

even if i only assume the second.

but whats even worse:

you have no idea what this is all about dont you ?

if the question is so simple , why dont you give the formula for the 4 periods ?

you refer to " almost periodic functions"

if you truely are a prof , i assume a prof in physics.

why ? because only in physics this could work out.

in math , this is a mistake.

it works out for problems like n−body problems or quasicrystals, because they can be solved with the math of almost periodic functions ...

because they ARE almost periodic functions

however my questions was quite different.

definition of almost periodic function :

F(x) is almost−periodic if every sequence of

translates of F(x) has a uniformly convergeant
subsequence.

almost periodicity is a property of dynamical

systems that appear to retrace their paths through
phase space, but not exactly.

OK, I'll read the rest of that wikipedia article as well.

if we consider functions based on time then a

theorem of Kronecker (yes kronecker THE ENEMY OF
CANTOR !! doing math cantor could not !) from
diophantine approximation can be utilized to show
that a particular configuration that ocurs once, will
recur to within any specified accuracy in finite
time.

(haha you yourself lead me to a theorem of kronecker

while you are a cantorian :p)

the problems are that this does not apply well with

my questions because of at least 2 reasons :

1) for almost periodic functions we have the

condition

ABS [F(t) − F(t + P)] < B

where abs is the absolute value , t is time and the

real parameter of the function , P is the almost
period and B is finite real number.

Apparently you didn't read the article thotoughly enough.
With your definition I could take F=characteristic function of rationals,
B=1.1, P=17 and qould obtain that F is almost−periodic with almost period 17.
Instead, the definition should be that for every B>0 you can find a P>0 (thus depending on B) such that etc.

compare with my question ; 1) the restriction B is not present , my fourrier series can go to infinity !!!

so the condition of almost periodic functions is not matched !!

(it is usually so in physics because we have finite distance as in n−body problems and similars)

so B is not matched , and neiter is P as shown in 2)

2) since we have 4 periods we have a lot of periods ; therefore none of them can be dominant so we dont have an approximation to a certain period −−> P cannot be determined consistantly.

3) well ill spare you that , not to embarras you to much :p

perhaps you where thinking what about quasiperiodic

functions then ??

1) not invented by quasi despite he understands them
2) dont work either

i guess you will have to invent something new to

analyse

4−periodic functions

Once again, you talk about mathematics that you don't
have any understanding of.

now i showed you didnt :)

You should really learn to

stop doing that. The sum of two (continuous) periodic
functions is almost periodic.

i agree with that :−)

That's a fact, even

if it's not mentioned in the place where you found
the (garbled) definition above.

lol, i agree with you :)

read the title david :

FOUR periods

not just 2 ...

you know 2 + 2 = 4 so just adding 2 periods is insufficient.

why cant you just admit you are wrong.

or give the solution

you never do either.

because you cant solve it , and neiter admit it.

but hey look on the bright side i agree on what you said ....

yet it is not relevant of course

you really have to do better than this if you want to give the solution or show that i am wrong.

answering a 4 period question with a 2 period answer ...

lol

perhaps you want to add 2 almost periodic functions and call them
ullrich−almost−5−periodic−functions to tackle the problem...

> and it works fine with the above definition.
>
> > perhaps ullrich−almost−3−periodic−functions
> > or ullrich−almost−5−periodic−functions
> >
> > tommy1729
> > "tommy is tommy, crazy but crazy like a fox"
> > "polysigned is the future"
> > "what is g(g(x))=f(x) to easy for you ? "
> > "math is bigger than physics"
> > "tommy is undecidable"
> >
> > > ************************
> >
> > David C. Ullrich
>
> ************************

David C. Ullrich

regards funny david
tommy1729

Assume A has the property
forall eps>0: exists P>0: forall x: |A(x)−A(x+P)| < eps
(aka. almost periodic)
and B is continuous and periodic with period Q.
Then C:=A+B is almost periodic.
Proof:
Assume eps>0 given.
Let eps_n be a sequence of positive numbers converging to 0.
For each n, there is an eps_n−almost period P_n of A.
The sequence P_n mod Q has an accumulation point R.
Wlog. P_n mod Q converges to R.
Let k_m be a sequence of positive integers such that
k_m*R mod Q converges to 0 (or Q if you like).
For each m, we have eps_n < eps/(2*k_m) for n big enough.
By taking a subsequence of the P_n, we may assume wlog. that
eps_n < eps/(2*k_n) for all n.
Again by taking a subsequence of the P_n (but not the k_n),
we may assume that k_n*P_n mod Q converges to 0 (i.e. the
difference between k_n*P_n and the closest integer multiple of Q
converges to 0).
Observe that k_n*P_n is an eps/2−almost period of A
per telescope summing.

Next, the Q−periodic functions B_n(x):=B(x)−B(x+k_n*P_n)
converge pointwise to 0.
The B_n are clearly equicontinuous and uniformly bounded.
Hence, by Arzela−Ascoli, some subsequence converges uniformly
(of course also towards the pointwise limit)
Wlog. B_n −> 0 uniformly.
Thus, for n big enough, |B_n(x)| < eps/2 for all x.
|C(x) − C(x+k_n*P_n)| <= |A(x)−A(x+k_n*P_n)| + |B(x)−B(x+k_n*P_n)|
< eps/2 + eps/2 = eps for all x.
Thus C is almost periodic. QED
(Gee, I'm so glad eps/2 worked out. I hate it when you
note that you have to go back and replace all eps/2 by eps/3) ;)

Corollary: The sum for finitely many continuous periodic functions
is almost periodic.
Proof: trivial induction.

I'm sorry that my proof is so lengthy ansd unelegant, but

I have read this thread and especially the definition of almost periodic just 10 minutes ago and I'm rather algebraist than analyst. Someone who has considered the original problem thoroughly for some time and can tell immediately when D. Ullrich is wrong, could surely make that proof more stringent.

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