Re: −−− −−− Irrational solutions

Source: http://sci.tech−archive.net/Archive/sci.math/2008−02/msg01284.html

- *From*: Deep <deepkdeb@xxxxxxxxx>
- *Date*: Thu, 7 Feb 2008 08:40:02 −0800 (PST)

On Feb 6, 4:20 pm, quasi <qu...@xxxxxxxx> wrote:

> On Wed, 06 Feb 2008 15:46:16 −0500, quasi <qu...@xxxxxxxx> wrote:
>
>> On Wed, 6 Feb 2008 12:08:29 −0800 (PST), Deep <deepk...@xxxxxxxxx> wrote:
>>
>>> On Feb 5, 3:48 am, quasi <qu...@xxxxxxxx> wrote:
>>>
>>>> On Mon, 4 Feb 2008 17:30:56 −0800 (PST), Deep <deepk...@xxxxxxxxx> wrote:
>>>>
>>>>> On Feb 4, 7:12 am, quasi <qu...@xxxxxxxx> wrote:
>>>>>
>>>>>> On Sun, 3 Feb 2008 05:24:36 −0800 (PST), Deep <deepk...@xxxxxxxxx> wrote:
>>>>>>
>>>>>>> On Feb 2, 11:34 pm, quasi <qu...@xxxxxxxx> wrote:

On Sat, 2 Feb 2008 18:04:43 −0800 (PST), Deep <deepk...@xxxxxxxxx> wrote:

Consider the following equation under the given conditions.

R^(1/2) = n^(k−2)[S/T]

(1)

where

S = m^(k−1) − Am^(k−3) + Bm^(k−5) −

..

−
k
(2)

T
=
n^(k−1)
−
An^(k−3)
+
Bn^(k−5)
−
...
..−
k

(3)

mn
=
1

(4)

Condition:
R
is
positive
rational
but
not
a
perfect
square.

k is a prime > 3, A, B, .. divisible by k

Assertion: m = u^(1/2) where u is rational but not a perfect square will satisfy (1)

You need to declare the restrictions on _all_ your variables.

Let's see what you

forgot
...

Variables:
R,
S,
T,
k,
m,
n,
A,B,
...

Restrictions:

R
is
a
positive
rational
but
not
a
perfect
square.

S,T
are
what?
Presumably
positive
reals,
but
you
didn't
say.

k

is a prime, k > 3

mn = 1, but m,n are what? Presumably positive reals,

but you didn't say. You did state an asserted _conclusion_

about m,n but not a declaration of their types in the hypothesis.

A,B, ... are

"divisible by k". Thus, A,B, ... are presumably integers, but you didn't say. Without further specification, one would have to assume arbitrary integer multiples of k, possibly zero, possibly negative. If that's not what you intended, you have to make your restrictions clear.

You are often careless in this regard, and several times in the past I've made the same objection. You need to declare the types and restrictions on your variables −− _all_ of them.

Although I can see in advance that for any of the likely specifications for the missing declarations, your assertion is false, there's no sense trying to provide a counterexample until you fully specify all the conditions. Thus, before exposing the hopelessness of your almost certainly false assertion, please fix your problem statement. Also, you have a typo in condition (2).

Thank you very

much for your comments. Your comments are valid and I must be careful in defining the problem. Now kindly note the following:

1. All the variables are real and each > 0
2. Each of the variables A, B, ... is an integer and divisible by k.
3.

Prime k > 3 4. S and T are defined in terms of m and n so they are also real. 5. mn = 1 6. My goal is to prove that only m = u^(1/2) will satisfy the condition R^(1/2) is irrational

and R is rational given u is

rational
but
not
a
perfect
square.

I
thank
you
for
your
helpful
comments
and
I
look
forward
to
hearing
from
you
about
the
correctness
of
the
assertion.

The
assertion is
false.
Moreover,
counterexamples
can be
created
almost
arbitrarily.
Here's one
counterexample,
done with
one eye
closed (in
other words,
there was
no need to
get clever)

...

Let k = 7.

Let n = the positive root between 1 and 1.1 of the equation

−223*n^14

+3171*n^12

−17563*n^10

+47712*n^8

−65968*n^6

+43813*n^4

−10941*n^2
+1
= 0

Then n is approximately equal to 1.001383065.

Let m = 1/n.

Then m is approximately .9986188452.

Let S = m^6
− 7m^4 +
28m^2 − 7

Then S is
approximately
14.95304266.

Let T = n^6
− 7n^4 +
14n^2 − 7

Then T is
approximately
1.008273500.

Let R =
(n^10)*(S/T)^2

Then R is
exactly
223.

Thus, all the
conditions
of your
hypothesis
are
satisfied,
but m,n are
of degree 14
over Q,
hence your
asserted
conclusion
fails.

So that
takes care
of your
latest
flawed
conjecture.

Let me
make some
general
remarks.
This is one
of dozens of
such
systems of
equations
you've
posted to
sci.math,
and in
almost
every
case, your
assertion
had no
chance of
being true.
My
recommendation
is
to stop
wasting
time with
these
meaningless
wild goose
chases.

In a
previous
thread, I
asked you
what these
mysterious
systems of

equations were all about, but you dodged the question. However a recent thread of yours gave away the object of your secret quest −− you're hunting FLT. In principle, there's nothing wrong with that, except that the particular strategy you're stuck on is doomed to failure −− guaranteed, perpetual failure. There has to be a more productive use of your time and energy.

I would stop fooling with these systems of equations. Not only do they not work, but you have no idea _why_ they fail. Instead, why not start a serious self−study of

(1) elementary number theory −− divisibility, congruences
(2) abstract algebra −− groups, rings, fields
(3) linear algebra −− brief review of vector spaces, linear maps
(4) field theory −− galois theory
(5) algebraic number theory

Give yourself a year or two, maybe more. Speed is not as important as mastery, so however long it takes. But

all of the
above
self−study
courses
should be
done with
full rigor −−
in other
words,
proofs,
not just
assertions.

Assuming
you
complete
the above,
you can
then pursue

(6)
commutative
algebra
(7)
algebraic
geometry

at which
point you
will have
some
serious
power tools
for dealing
with
the kinds of
problems
that you
seem to be
interested
in.

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Thank you very much for your comments. It is always nice to have someone else's view points. I welcome your friendly advice. It will be very helpful. If your time and interest permit kindly reply to the following:
1. If S, T, n are approximate then why should R be exact?

No, they are _all_ exact. S,T are defined exactly in terms of n, and n is defined exactly as the only real root in a specified interval for a specified equation with rational coefficients. The value of n is uniquely determined by that specification, so in that sense, it's exact. However n cannot be expressed as a finite algebraic expression using the standard arithmetic operations, radicals, and rational constants. Still, as specified by its defining equation and bounding interval, n is exact.

2. Why m = sqrt(q) where q is a positive rational cannot be a solution of (1)?

Maybe it can, but the point is, m doesn't
have to be of that form.

You asserted that m,n must have that form.
A single counterexample
(for example, the one I provided), suffices to
show that your
assertion is false.

I was under the impression that the chapter is closed because
you
adequately explained the situation and also gave a counter
example.
Because of my lack of understanding I am asking you for a
little
clarification and would appreciate your reply. Kindly note I
am
referring to (1) which generated this discussion. I repeat:
R^(1/2) = n^(k−2)* S/T   (1), R is a positive rational but not
a
perfect square.
For simplicity you chose k = 7 ok. Nothing else is given.
How did you get the equation −223n^14 + 3171n^12 − ...   ...
+1 =
0   (2)
True, (2) will give 14 values of n.
Did you imply that only one will be real positive and have
value
between 1 and 1.1?
Your simple reply will be very helpful.

First I chose k = 7, an essentially arbitrary odd prime.

I could have used k = 5. I forget why I chose 7. I think, for some reason, I felt k = 7 was safer. But the choice is not important −− we only need one counterexample.

Next, leaving m,n unknown, I declared the relations

S = m^6 − 7m^4 + 28m^2 − 7

T = n^6 − 7n^4 + 14n^2 − 7

R = (n^10)*(S/T)^2

m = 1/n

The choice of coefficients for the forms of R and S was in accordance

In the above line, I meant to say "S and T", not "R and S"

with your specifications, but again, almost arbitrary. I think the choice of 28 and 14 were chosen via a little trial and error (and some intuition) in order to force S,T to be positive, while allowing R to be settable as some positive integer non−square. Why close to 1? Because that way, I could easily estimate the results in advance by hand. Thus, using m = n = 1 to get an estimate, I get S close to 15, T close to 1, R close to 225.

Next, after replacing m by 1/n, I set R = 223 (just some positive integer non−square close to 225).

The equation R = 223, regarded as an equation in the variable of n, was expected to have a real root near 1. It does. Choosing that root (which lies between 1 and 1.1), the values of all the variables are then determined, and− Hide quoted text −

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You have adequately given enough explanation how did you come with a 14th Deg. equation. Thanks. I am sending another inquiry and you are under no obligation to respond. Now kindly note:

Let n = sqrt(u/v) where (u, v) = 1 and u and v are very very close so that n is approximately very very close to 1
You will still get a 14th deg equation when solved numerically will give n = 1. (very approximately).

How can you prove or disprove that one of the solutions will be real and must be of the form n = sqrt(u/v). A simple intuision tells me that one of the real solutions must be n = sqrt(u/v).
Apparently you disagree but willing to accept "may" instead of "must".

Thank you for your kind attention.

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