Re: Property of an equation

Source: http://sci.tech−archive.net/Archive/sci.math/2007−04/msg02656.html

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- *From*: Deep <deepkdeb@xxxxxxxxx>
- *Date*: 19 Apr 2007 06:07:17 −0700

On Apr 18, 10:33 pm, quasi <q...@xxxxxxxx> wrote:

> On 18 Apr 2007 17:32:13 −0700, Deep <deepk...@xxxxxxxxx> wrote:
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>> On Apr 18, 1:00 pm, quasi <q...@xxxxxxxx> wrote:
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>>> On 18 Apr 2007 05:38:39 −0700, Deep <deepk...@xxxxxxxxx> wrote:
>>>
>>>> On Apr 17, 11:55 pm, quasi <q...@xxxxxxxx> wrote:
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>>>>> On 17 Apr 2007 18:36:40 −0700, Deep <deepk...@xxxxxxxxx> wrote:
>>>>>
>>>>>> ...
>>>>>> refer to (1), (2), (3) below under the given conditions.
>>>>>>
>>>>>> $X^{1/2} = g(g^4 - 10g^2h^2 + 5h^4)$ (1)

Y^1/2 = h(h^4 −10h^2g^2 + 6g^4) (2)

Z = g^2 + h^2 (3)

Conditions: X and Y are nonsquare integers and Z is odd such that (X, Y, Z) = 1. g and 5h have no common factor, h and 5g have no common factor. (Example: sqrt(3) and 2.sqrt(5) have no factor in common), g and h are non integers.

These conditions need clarification.

Can we assume that g and h are real?

When you say that g and h are non integers, the concept of "no common factor" needs to be specified more clearly. The example you gave is not clear enough from my perspective.

Are g and h assumed to be elements of a (not necessarily the same) quadratic number field?

If you eliminate g and h from those equations, you get a rather ugly diophantine equation in x,y,z which appears to have only trivial integer solutions. That suggests that, even if we disregard the conditions you imposed on g and h, keeping only your conditions on x,y,z, your equations are unsatisfiable. Do you know of even one solution to your system satisfying your conditions on x,y,z?

quasi

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Many thanks.I believe we are coming to a conclusion. Let g/h = m/n (1.c)

If in (1.c) the condition g = m and h = n always hold then g and h have no factor in common.

No, this is still not clear. You're saying that g and h have no common
factor if the equation g/h = m/n implies g=m and h=n. That doesn't
make sense to me. For example, certainly g/h = (2g)/(2h).

Before you can talk meaningfully about common factors, you need to
specify the set of all possible factors. If g,h were restricted to a
given ring, then perhaps the concept could be made precise. Even then,
you would have to worry about whether factorization in your ring is
always finite and if it is, whether you have unique factorization.

> Again, g and h are real. They may belong to
> any field.

Can we assume that g and h are positive reals, and that x,y,z are
positive integers?

> You stated (1), (2), (3) have no solutions
> even without the given
> conditions. Kindly justify your statement
> mathematically or otherwise.
> ***
> Your feedback and help are appreciated.

I didn't mean to imply that I could prove that there are no solutions.
My claim that there appeared to be only trivial solutions was based on
looking at numerical data. I asked you if you knew of even one
solution satisfying your conditions. Well, do you?

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Let me again clarify what is a "common factor". Let g ,h, r, m,. n be real numbers. No other restrictios are imposed.
Let g = rm and h = rn. If g/h = m/n then r is the common factor. Otherwise, g and h have no factor in common. The case r= 1 need not be considered.

No, you can't get away with the above concept of common factor, so slow down and let's try to resolve the issue. You can't just brush it aside.

Your "definition" of common factor for real numbers is seriously flawed. Let g and h be any two reals numbers. Then, by your specification, _every_ nonzero real number r would be a common factor of g and h. Simply let m=g/r and n=h/r and you get g=rm and h=rn. Thus, unless you revise the concept of what you mean by common factor, you can't produce a pair of real numbers which actually have a greatest common factor.

Now based on my previous explanations consider (1.2) and (2.2) as below.

X = (g^2)(G^2) (1.2); Y = (h^2)(H^2)
(2.2)

X, Y are nonsquare integers each > 1 and none is a prime. There is no common factor between g^2 and G^2, No common factor between h^2 and H^2; (X, Y) = 1.

Under these circumstances I conclude, g^2 is an integer and G^2 is also an integer.

> If you disagree with my conclusion kindly tell me your reason of
> disagreement so that I can adequately address your issue.
> Otherwise, I would believe that you agree with my conclusion.

I don't agree with it. You first have to resolve the meaning of common factor for pairs of real numbers. You show me two real numbers which you think have no common factor and I'll show you that you're wrong (unless you either revise your set of allowable real numbers, or revise your definition of common factor, or both).

As for the claim you made about the earlier system of equations as specified your previous message, there's no evidence that I can see to support such a claim. Moreover, the claim is somewhat meaningless if, as the numerical evidence suggests, and assuming x,y,z are required to be positive integers, there are actually no solutions to your system.

> A simple but useful reply will be highly appreciated.

You have to answer questions as well.

There are a couple of questions I've asked that you never responded to, so let me ask them again ...

These questions relate to the system of equations as specified in your previous message (3 equations in 5 variables x,y,z,g,h).

(1) Can I assume the quantities g and h are positive reals and that x,y,z are positive integers?

(2) Do you know of even one solution to your system? If so, please produce it. If not, what makes you think there is one?

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Yes, all the variables are positive real. z is odd, (x, y, z) = 1
My assertion: both g^2 and h^2 are positive real integers. I donot
have any example.
If you donot agree with the assertion, kindly let mev know why?. I wil
then respond to you
in more meaningful way.

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