

Re: gcd of two polynomials over $\mathbb{Q}[i]$

Source: <http://sci.tech-archive.net/Archive/sci.math.symbolic/2006-12/msg00060.html>

- *From:* "Chip Eastham" <hardmath@xxxxxxxxxx>
 - *Date:* 16 Dec 2006 06:26:29 -0800
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Jeremy Watts wrote:

"Jeremy Watts" <stevie4545@xxxxxxxxxx> wrote in message
[news:frugh.16598\\$HV6.11142@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:frugh.16598$HV6.11142@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx)

this is carrying on from my previous post. i have attempted to find the

gcd

of the following polynomials using the "wims" site,

<http://wims.unice.fr/wims/wims.cgi?session=BO38B7C34A.3&lang=en&cmd=reply&mo>

dule=tool%2Farithmetic%2Fbezout.en&x1=%286%2F5%29x%5E4%2B%28-39%2F5%2B622%2F

65i%29x%5E3%2B%281422%2F65-311%2F5i%29x%5E2%2B%28-72%2B5598%2F65i%29x%2B1296

%2F13&x2=%289%2F5%29x%5E3%2B%2857%2F5-24%2F13i%29x%5E2%2B%28-24-152%2F13i%29

x%2B320%2F13i&gcdlcm=yes&euclid=yes&euc1=1&euc2=2

it seems to use the standard euclidean algorithm to accomplish this, but
from what i can see the gcd is :-

((8978642999775/15211817454289-11763279964575/15211817454289I)
x+(-156843732861000/197753626905757-119715239997000/197753626905757i))

but it claims that the gcd is $3/5x-8/13i$ (which is indeed the correct

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answer)

How does it get from the answer with these horrifically high numbers to $3/5x - 8/13i$? My guess was that it divides throughout by the gcd of

the

two complex numbers ie. the one being the coefficient of x , the other

being

the constant term, hence my first post on complex gcd's.

is this correct? how does it finally arrive at $3/5x - 8/13i$?

sorry with that link you will have to paste it into your browsers address bar, then on the wims page check the "gcd(F1,F2) and lcm(F1,F2)" and "Successive euclidean divisions...." boxes and press compute

Apparently your link (URL) contained a session token which is no longer cached at the website. I have no way of knowing what your input polynomials were, or of recomputing their CGD.

However as I've noted on the other thread, normalizing the GCD as a monic polynomial (since $\mathbb{Q}(i)$ is a field) gives a canonical representative, as Waldek Hebisch elegantly did using Axiom's factor command (below in this thread).

regards, chip

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