Re: Integer−Valued Polynomials

Source: http://sci.tech−archive.net/Archive/sci.math/2006−03/msg00028.html

- *From*: Virgil <ITSnetNOTcom#virgil@xxxxxxxxxxx>
- *Date*: Tue, 28 Feb 2006 21:15:12 −0700

In article
<852523.1141159679225.JavaMail.jakarta@xxxxxxxxxxxxxxxxxxxxxxx>,
Maury Barbato <mauriziobarbato@xxxxxxxx> wrote:

> Maury wrote:
>
> > Two remarks:
> > (I)Newton method works also for several
> > variables and for general fields?
>
> There is a risk of confusion in terminology here. I
> mentioned (1) interpolation and (2) Newton divided
> differences (as a specific approach to finding an
> interpolating polynomial). Newton's method often
> refers to root finding, and while a multivariate form
> of this (usually called Newton−Raphson) exists, it
> has little to do with the question of interpolation.
>
> Interpolating polynomials in many variables, versus
> in one variable, does introduce a complication of
> choosing interpolating points not "correlated" by
> a polynomial of smaller degree. See this easily
> read survey−style article for more information:
>
> [Polynomial interpolation in several variables −
> by Tomas Sauer]
> http://www.uni−giessen.de/tomas.sauer/Publ/MAIA.pdf
>
> > (II) Even if it works, it can't be very useful. How
>
> could
>
> > you apply it, to use later the "Identity
>
> Polynomials

> > Principle"?
> > But your argument intended maybe to be only
>
> intuitive.
>
> My "argument" is an outline, but if you have specific questions perhaps I can fill in more details.
>
> regards, chip

> The point is: let P(x_1,...,x_n) be a complex polynomial with integer values when (x_1,...,x_n) is in Z^n. How do you construct a rational polynomial Q(x_1,...,x_n) wich agrees with P on Z^n?
> It seems to me a weak point in your argument.
> Thanks again for your hope and your interest.
> My Best Regards,
> Maury

Any polynomial function, as long as the number of variables and degree are both finite, as usual for polynomials, can be totally determined by its values at a sufficient number of points.

If there is solution at all, it is merely a matter of solving a suitable system of linear equations with the polynomial's coefficients as unknowns.
.