

Re: Dividing Power Series

Source: <http://sci.tech-archive.net/Archive/sci.math/2004-08/2962.html>

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Date: 08/16/04

Date: 15 Aug 2004 22:17:18 -0700

David C. Ullrich <ullrich@math.okstate.edu> wrote in message news:<9dnh0hl69n7mr9rdbq0q34g8p81hrj9q@4ax.com>...
> On 15 Aug 2004 11:12:44 -0700, contactgreg@hotmail.com (Gregory Magarshak) wrote:
>
> >Can I divide power series by long division as follows:
>
> yes, at least for z in a disk where both series converge
> and the divisor has no zero.

If the divisor has a zero at the origin, then you get a Laurent series about 0 (for example, $\cos z / \sin z$)

> pf: the two series define analytic functions f, g in
> this disk. now $h = f/g$ is analytic in this disk, so
> it has a power series. it's easy to show you can
> get the series for $f = g*h$ by multiplying the series
> for g and h formally, and long division is just the
> inverse of formal power-series multiplication [at
> each step the criterion you use to choose a
> coefficient for the quotient is exactly 'make
> the product $g*h$ come out right'.]

That was basically the proof I was alluding to, except I didn't want to work out the details in "make the product $g*h$ come out right" thing.

–Greg Magarshak

"Computers are useless. They can only give you answers." – Pablo Picasso.