Subject: Re: ProductLog function
Posted by pgrigis on Thu, 01 May 2008 13:26:39 GMT
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You could try to use a numerical solver like fx_root in IDL.

Ciao,
Paolo

emitch...@googlemail.com wrote:
> Hi all, I've used Wolfrang Mathmatica to solve an equation for x, and
> have been given a solution involving the function ProductLog. I was
> wondering if anyone knew if there was any inbuilt capacity in IDL to
> evaluate this. It's definitely different to PRODUCT(ALOG(x)), as I've
> tried this but results were wrong.
>
> I'm trying to convert a matrix of y's to x's, but the equation I need
> to use is:
>
> y = 0.0015x + a(1-exp(-bx))
>
> Mathmatica gave me (to 6sf):
>
> 0.333333(-2000.a + 2000.y +
> (3.ProductLog(666.667(a.b.exp(666.667b(1.a-1.y)))))/b
>
> I tried this in IDL, but no joy:
>
> (1D/3D)*(-2000D*a + 2000D*y + (3*(PRODUCT(ALOG((2000D/
> 3D)*a*b*exp((2000D/3D)*b*((a-1D)*(y))))))/b))
>
> Cheers,
>
> Ed

Subject: Re: ProductLog function
Posted by Vince Hradil on Thu, 01 May 2008 13:35:13 GMT
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On May 1, 6:32 am, emitch...@googlemail.com wrote:
> Hi all, I've used Wolfrang Mathmatica to solve an equation for x, and
> have been given a solution involving the function ProductLog. I was
> wondering if anyone knew if there was any inbuilt capacity in IDL to
> evaluate this. It's definitely different to PRODUCT(ALOG(x)), as I've
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>
> Cheers,
>
> Ed

A quick search of the 'net yielded: http://en.wikipedia.org/wiki/Lambert%27s_W_function

Unfortunately, a quick search of IDL help yielded only Lambert wrt map projections. However, the wiki page above has an evaluation algorithm.

BTW - I used Maxima to get:

$$[x = -\frac{\%e^{-bx}\,(\%e^{bx}\,(a-y)-a)}{c}]$$

Which you could solver iteratively...

Good luck!

Subject: Re: ProductLog function
Posted by Allan Whiteford on Thu, 01 May 2008 13:36:02 GMT
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emitchard@googlemail.com wrote:
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> have been given a solution involving the function ProductLog. I was
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> 3D)*a*b*exp((2000D/3D)*b*((a-1D)*(y))))))/b))
>
> Cheers,
>
> Ed
>
>

Ed,

I think you're looking for an implementation of the Lambert W function. IDL doesn't have one inbuilt. You can probably find a Fortran or C implementation and convert or use it;

http://www.netlib.org/toms/443

seems to do it.

Thanks,

Allan

Subject: Re: ProductLog function
Posted by Jeremy Bailin on Fri, 02 May 2008 14:46:51 GMT
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If you're desperate, you can always get IDL to externally call Mathematica... or even better, if you know that you'll be calling it with a fairly restricted range of y values, get Mathmetica to pump out a densely sampled array of x,y pairs to a file and then interpolate within IDL.

That said, I'd probably just go the route Paolo suggests and solve it numerically within IDL.

-Jeremy.

On May 1, 7:32 am, emitch...@googlemail.com wrote:
> Hi all, I've used Wolfrang Mathmatica to solve an equation for x, and
> have been given a solution involving the function ProductLog. I was
> wondering if anyone knew if there was any inbuilt capacity in IDL to
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