Subject: IDL is not accurate enough! Posted by noahh.schwartz on Thu, 28 Aug 2008 16:30:14 GMT View Forum Message <> Reply to Message

Hi,

I've been having problems with IDL accuracy. I'm trying to perform calculations using the gamma function. The problem is that it grows VERY fast! Performing this calculation in double (namely gamma(x)/gamma(y) with x and y big) yields the result: NaN...

Would it be possible to use a program like 'Mathematica' (or any other) and to plug it in my ILD program? Some kind of CALL_EXTERNAL that is to say. If it is possible, how can I do it and what is the best program to use?

Thanks, Noah

Subject: Re: IDL is not accurate enough!
Posted by Haje Korth on Tue, 02 Sep 2008 12:20:04 GMT
View Forum Message <> Reply to Message

Noah,

other in this thread have laid out the issue, nothing to add here. If you want to go brute force with extended precision, check out the cephes math library at http://www.netlib.org/cephes/. There is an extended precision version that has a gamma function. I have used that in the past for calculating hypergeometric functions and it served my needs. I used call external, but you can certainly turn this into a dlm.

Cheers, Haje

<noahh.schwartz@gmail.com> wrote in message
news:c7b7fc70-b4db-4c3d-8d2b-50f88dbd1d62@s50g2000hsb.google groups.com...

> Hi,

>

- > I've been having problems with IDL accuracy. I'm trying to perform
- > calculations using the gamma function. The problem is that it grows
- > VERY fast! Performing this calculation in double (namely gamma(x)/
- > gamma(y) with x and y big) yields the result: NaN...
- > Would it be possible to use a program like 'Mathematica' (or any
- > other) and to plug it in my ILD program? Some kind of CALL_EXTERNAL
- > that is to say. If it is possible, how can I do it and what is the
- > best program to use?

>

> Thanks,

Subject: Re: IDL is not accurate enough!
Posted by Kenneth P. Bowman on Thu, 04 Sep 2008 20:33:21 GMT
View Forum Message <> Reply to Message

In article

<e32f4688-b58e-4f27-b2f9-17faea24285a@i24g2000prf.googlegroups.com>, rtk <oneelkruns@hotmail.com> wrote:

- > On Aug 28, 2:50 pm, "Kenneth P. Bowman" <k-bow...@null.edu> wrote:
- >> Mathematica can do arbitrary-precision arithmetic ... with hundreds of digits,
- >> if necessary. Don't expect it to be fast, though, as it is all done
- >> in software, not with the hardware floating-point unit with which we
- >> normally do single- and double-precision arithmetic.

>

- > Check on the IDL code contrib site sometime next week. I just
- > uploaded DLMs that add arbitrary precision floating point as well as
- > integer and rational types to IDL. These are wrappers on the MPFR and
- > GMP libraries, respectively. Caveat emptor, but I'll answer emails.
- > You will need to recompile if using something later than IDL 6.3.
- > Examples included.

>

- > Ron Kneusel
- > rkneusel@ittvis.com

So, when you say DLMs, does that mean Windows only? It means nothing to me as a Linux and Mac user.

Ken Bowman

Subject: Re: IDL is not accurate enough!
Posted by Michael Galloy on Fri, 05 Sep 2008 15:57:38 GMT
View Forum Message <> Reply to Message

On Sep 4, 2:33 pm, "Kenneth P. Bowman" <k-bow...@null.edu> wrote:

- > So, when you say DLMs, does that mean Windows only? It means nothing
- > to me as a Linux and Mac user.

DLMs (Dynamically Loadable Modules) are available on all platforms. This is a way of wrapping and loading C code to make it usable from within IDL. DLLs are a Windows thing (the equivalent of a shared object on Unix).

Mike

www.michaelgalloy.com Tech-X Corporation Software Developer

Subject: Re: IDL is not accurate enough!

Posted by MP on Fri, 05 Sep 2008 16:18:27 GMT

View Forum Message <> Reply to Message

On Sep 5, 9:57 am, "mgal...@gmail.com" <mgal...@gmail.com> wrote:

- > DLMs (Dynamically Loadable Modules) are available on all platforms.
- > This is a way of wrapping and loading C code

and Fortran code, too!

mp

Subject: Re: IDL is not accurate enough!

Posted by Kenneth P. Bowman on Fri, 05 Sep 2008 16:53:05 GMT

View Forum Message <> Reply to Message

In article

<53e9aaf0-6cd2-41c0-95ca-1559353845a4@m36g2000hse.googlegroups.com>, "mgalloy@gmail.com" <mgalloy@gmail.com> wrote:

>> to me as a Linux and Mac user.

>

- > DLMs (Dynamically Loadable Modules) are available on all platforms.
- > This is a way of wrapping and loading C code to make it usable from
- > within IDL. DLLs are a Windows thing (the equivalent of a shared
- > object on Unix).

>

- > Mike
- > --
- > www.michaelgalloy.com
- > Tech-X Corporation
- > Software Developer

Thanks, Mike. I will take a look and see what I need to do to make one work.

Ken

Subject: Re: IDL is not accurate enough! Posted by pgrigis on Thu, 11 Sep 2008 14:35:27 GMT

View Forum Message <> Reply to Message

```
noahh.schwa...@gmail.com wrote:
```

```
>> On Thu, 28 Aug 2008, noahh.schwa...@gmail.com wrote:
>>> Hi,
>>
>>> I've been having problems with IDL accuracy. I'm trying to perform
>>> calculations using the gamma function. The problem is that it grows
>>> VERY fast! Performing this calculation in double (namely gamma(x)/
>>> gamma(y) with x and y big) yields the result: NaN...
>>> Would it be possible to use a program like 'Mathematica' (or any
>>> other) and to plug it in my ILD program? Some kind of CALL EXTERNAL
>>> that is to say. If it is possible, how can I do it and what is the
>>> best program to use?
>>> Thanks,
>>> Noah
>>
>> gamma(x)/gamma(y) => exp(lngamma(x)-lngamma(y))
>>
>> regards,
>> lajos
>
>
> Ingamma works fine for my propose! Would you know if an equivalent
> function exists for the beselk function? Something like Inbeselk?
> beselk(x) for x>709 doesn't seen to work.
```

Isn't 0 a good enough approximation?

Paolo

- > If not, I guess that I'll have to wait for the DLMs that add arbitrary
- > precision floating point...
- > cheers,
- > Noah

>

Subject: Re: IDL is not accurate enough!
Posted by pgrigis on Thu, 11 Sep 2008 14:44:44 GMT

View Forum Message <> Reply to Message

pgri...@gmail.com wrote:

```
> noahh.schwa...@gmail.com wrote:
>>> On Thu, 28 Aug 2008, noahh.schwa...@gmail.com wrote:
>>>> Hi,
>>>
>>>> I've been having problems with IDL accuracy. I'm trying to perform
>>> calculations using the gamma function. The problem is that it grows
>>>> VERY fast! Performing this calculation in double (namely gamma(x)/
>>> gamma(y) with x and y big) yields the result: NaN...
>>>> Would it be possible to use a program like 'Mathematica' (or any
>>> other) and to plug it in my ILD program? Some kind of CALL_EXTERNAL
>>>> that is to say. If it is possible, how can I do it and what is the
>>> best program to use?
>>>
>>>> Thanks,
>>>> Noah
>>> gamma(x)/gamma(y) => exp(lngamma(x)-lngamma(y))
>>>
>>> regards,
>>> lajos
>>
>>
>> Ingamma works fine for my propose! Would you know if an equivalent
>> function exists for the beselk function? Something like Inbeselk?
>> beselk(x) for x>709 doesn't seen to work.
Isn't 0 a good enough approximation?
If not, \log(K(x,n)) \sim \ln(\operatorname{sqrt}(!\operatorname{pi}/(2^*x))) - x for large x
Paolo
> Paolo
>> If not, I guess that I'll have to wait for the DLMs that add arbitrary
>> precision floating point...
>>
>> cheers.
>> Noah
```

Subject: Re: IDL is not accurate enough! Posted by noahh.schwartz on Mon, 15 Sep 2008 09:37:01 GMT

```
On 11 sep, 16:44, pgri...@gmail.com wrote:
> pgri...@gmail.com wrote:
>> noahh.schwa...@gmail.com wrote:
>>> On 28 ao t, 18:42, F LDY Lajos <fo...@rmki.kfki.hu> wrote:
>>> On Thu, 28 Aug 2008, noahh.schwa...@gmail.com wrote:
>>>> > Hi,
>
>>> > I've been having problems with IDL accuracy. I'm trying to perform
>>>> > calculations using the gamma function. The problem is that it grows
>>> > VERY fast! Performing this calculation in double (namely gamma(x)/
>>> > gamma(y) with x and y big) yields the result: NaN...
>>> > Would it be possible to use a program like 'Mathematica' (or any
>>> > other) and to plug it in my ILD program? Some kind of CALL_EXTERNAL
>>>> > that is to say. If it is possible, how can I do it and what is the
>>> > best program to use?
>>>> > Thanks,
>>>> >Noah
>>> gamma(x)/gamma(y) => exp(lngamma(x)-lngamma(y))
>>>> regards,
>>>> lajos
>>> Ingamma works fine for my propose! Would you know if an equivalent
>>> function exists for the beselk function? Something like Inbeselk?
>>> beselk(x) for x>709 doesn't seen to work.
>> Isn't 0 a good enough approximation?
  If not, \log(K(x,n))\sim \ln(\operatorname{sqrt}(!\operatorname{pi}/(2^*x)))-x for large x
>
 Paolo
>
>
>> Paolo
>>> If not, I guess that I'll have to wait for the DLMs that add arbitrary
>>> precision floating point...
>>> cheers.
>>> Noah
```

Hi Paolo,

Your approximation seems to be missing a factor? This is what IDL gives me:

```
IDL> x=705d & n=1.1 & print, alog10(beselk(x,n)), (alog(sqrt(!pi/(2*x)))-x)
-307.50372 -708.05331
```

Cheers, Noah

Subject: Re: IDL is not accurate enough!
Posted by pgrigis on Mon, 15 Sep 2008 13:40:22 GMT
View Forum Message <> Reply to Message

```
noahh.schwa...@gmail.com wrote:
> On 11 sep, 16:44, pgri...@gmail.com wrote:
>> pgri...@gmail.com wrote:
>>> noahh.schwa...@gmail.com wrote:
>>> On 28 ao t, 18:42, F LDY Lajos <fo...@rmki.kfki.hu> wrote:
>>> > On Thu, 28 Aug 2008, noahh.schwa...@gmail.com wrote:
>>>> > Hi.
>>
>>> > > I've been having problems with IDL accuracy. I'm trying to perform
>>>> > calculations using the gamma function. The problem is that it grows
>>> > VERY fast! Performing this calculation in double (namely gamma(x)/
>>> > gamma(y) with x and y big) yields the result: NaN...
>>> > > Would it be possible to use a program like 'Mathematica' (or any
>>> > other) and to plug it in my ILD program? Some kind of CALL_EXTERNAL
>>>> > that is to say. If it is possible, how can I do it and what is the
>>> > best program to use?
>>
>>>> > Thanks,
>>>> > Noah
>>
>>> > gamma(x)/gamma(y) => exp(lngamma(x)-lngamma(y))
>>
>>>> > regards,
>>>> > laios
>>
>>>> Ingamma works fine for my propose! Would you know if an equivalent
>>>> function exists for the beselk function? Something like Inbeselk?
>>> beselk(x) for x>709 doesn't seen to work.
>>
>>> Isn't 0 a good enough approximation?
\rightarrow If not, \log(K(x,n))\sim \ln(\operatorname{sqrt}(!\operatorname{pi}/(2^*x)))-x for large x
>>
```

```
>> Paolo
>>
>>
>>> Paolo
>>
>>>> If not, I guess that I'll have to wait for the DLMs that add arbitrary
>>> precision floating point...
>>
>>>> cheers,
>>>> Noah
>
>
> Hi Paolo,
> Your approximation seems to be missing a factor? This is what IDL
> gives me:
>
> IDL> x=705d & n=1.1 & print, alog10(beselk(x,n)), (alog(sqrt(!pi/
> (2*x))-x
      -307.50372
                     -708.05331
I meant the natural log (why should a bessel function
care about base 10 anyway?), so use alog instead.
Cheers,
Paolo
> Cheers,
> Noah
```