Subject: Fun with Int_tabulated.pro
Posted by wlandsman on Fri, 30 Oct 2009 17:20:57 GMT
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I ran into a couple of gotchas with int_tabulated.pro this
morning, It performs numerical integration for the simple case:

```
IDL> x = findgen(5)
IDL> y  = x^2
IDL> print,int_tabulated(x,y)
21.3333
```

But if one has flipped both vectors (say while converting wavelength
to frequency), then -- even though a plot of the two vectors looks
exactly the same -- int_tabulated gives a different answer.

```
IDL> x = reverse(x) & y = reverse(y)
IDL> print,int_tabulated(x,y)
42.3619
```

A closer look at the int_tabulated documentation tells us that if X if
not monotonic increasing, then one needs to set the /SORT keyword.
So now we follow the documentation:

```
IDL> print,int_tabulated(x,y,/sort)
21.3333
```

and get the right answer again. But as the documentation also "sort"
of warns
you, setting the /SORT keyword reorders the input X and Y variables.
This is
probably not a problem unless one has modified the Y vector on the fly
by
some factor f

```
 f = findgen(5) + 0.5
 print,int_tabulated(x, y*f,/sort)
```

Upon output, the X vector has been sorted, but the Y vector has not,
since it
was passed as part of a temporary variable y*f. So one has lost
the one to
one correspondence between X and Y, screwing up all subsequent
processing.

--Wayne

Subject: Re: Fun with Int_tabulated.pro
Posted by Paul Van Delst[1] on Wed, 04 Nov 2009 00:18:15 GMT
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Hello,

I've been struggling with int_tabulated recently but for a different reason: it always performs spline interpolation. If you are integrating high-order Gaussian-like functions with an insufficient point density (e.g. some satellite sensor measured spectral response functions), it will always produce terrible results due to Gibbs-type phenomena. In general that's not unexpected, but a bugger of a problem to track down in automated day-to-day processing.

I'm writing my own integrator to allow for different interpolation schemes. It handles the problem you're having too by simply copying the input to temporaries, and then doing all the sorting/uniq'ing/etc.

Anyway.... apologies for hijacking the thread. I just wanted to mini-vent. :o)

cheers,

paulv

wlandsman wrote:
> I ran into a couple of gotchas with int_tabulated.pro this
> morning, It performs numerical integration for the simple case:
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> f = findgen(5) + 0.5
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>
> Upon output, the X vector has been sorted, but the Y vector has not,
> since it
> was passed as part of a temporary variable y*f. So one has lost
> the one to
> one correspondence between X and Y, screwing up all subsequent
> processing.
>
> --Wayne

Subject: Re: Fun with Int_tabulated.pro
Posted by edward.s.meinel@aero. on Wed, 04 Nov 2009 16:47:02 GMT
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On Oct 30, 12:20 pm, wlandsman <wlands...@gmail.com> wrote:

> and get the right answer again. But as the documentation also "sort"
> of warns
> you, setting the /SORT keyword reorders the input X and Y variables.
>
> --Wayne

Wow. That's one rule my Numerical Analysis prof drilled into our heads
(too) many years ago: never, ever, ever, EVER modify the inputs to a
function call. Create a temporary variable inside the function and do
your modifications on that.

Ed

Subject: Re: Fun with Int_tabulated.pro
Posted by Chris[6] on Wed, 04 Nov 2009 17:50:00 GMT
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> Wow. That's one rule my Numerical Analysis prof drilled into our heads
> (too) many years ago: never, ever, ever, EVER modify the inputs to a
> function call. Create a temporary variable inside the function and do
> your modifications on that.

>
> Ed

I agree with this idea - any chance int_tabulated will be changed to protect the input variables?

Chris