Subject: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Emily Anne Moravec on Fri, 12 Aug 2011 20:26:28 GMT
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We are writing a program for our supervisor to take 8 spectra which are each a matrix of 16384 by 2. The part of the program we have already splits the matrices into single matrices. Which is the code below:

```
fitfilename1 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19010_x1dsum.fits'
  data1 = mrdfits(fitfilename1,1,hdr)
  w1 = data1.wavelength
  w1a=w1(*, 0)
  w1b=w1(*, 1)
  f1= data1.flux
  f1a=f1(*, 0)
  f1b=f1(*, 1)
.... etc. through 8
```

Then we must get a new graph with a span of wavelengths and interpolated flux values.
Here is the wavelength grid for the eventual interpolation:

```
wgrid=findgen(58400)*.01+1227  ; from 1227.00 to 1811.00
  help, /str, wgrid
```

Here is where we are trying to interpolate:

```
  linterp, w1a, f1a, wgrid, fint1a
  linterp, w1b, f2b, wgrid, fint1b
  linterp, w2a, f2a, wgrid, fint2a

..... etc through 8
```

But we get this error.

```
% Compiled module: INTERPOLATEDSIXTEEN.
MRDFITS: Binary table.  12 columns by  2 rows.
MRDFITS: Binary table.  12 columns by  2 rows.
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MRDFITS: Binary table.  12 columns by  2 rows.
 Parameter 3 (New X Vector or Scalar)  of routine LINTERP  is
undefined.
```

Valid dimensions are: scalar 1
Valid types are: byte int*2 int*4 real*4 real*8 Unsigned(i*2)
Unsigned(i*4) int*8 Unsigned(i*8)

Do we need to do something to our wgrid or to the interpolate command
to get it to work?

Also, in each of our 8 data sets, there is an increment of wavelength
values where the value of the flux is 0, which will make the average
of all 8 messed up. Do you have any ideas how to write a loop that
goes through all of the wgrid values and averages the values of the
interpolated flux values, but skips the flux values that are 0 and
continues to the next? Is there a skip command? Would a where command
work the best?

Here is what I started with :
for i=1227.00, (1227.00+58400*.01), 0.01 do ???

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Jeremy Bailin on Sat, 13 Aug 2011 00:26:14 GMT
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On 8/12/11 4:26 PM, Emily Anne Moravec wrote:
> We are writing a program for our supervisor to take 8 spectra which
> are each a matrix of 16384 by 2. The part of the program we have
> already splits the matrices into single matrices. Which is the code
> below:
>
> fitfilename1 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
> files/lbgu19010_x1dsum.fits'
>   data1 = mrdfits(fitfilename1,1,hdr)
>   w1 = data1.wavelength
>   w1a=w1(*, 0)
>   w1b=w1(*, 1)
>   f1= data1.flux
>   f1a=f1(*, 0)
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> .... etc. through 8
>
> Then we must get a new graph with a span of wavelengths and
> interpolated flux values.
> Here is the wavelength grid for the eventual interpolation:
>
> wgrid=findgen(58400)*.01+1227 ; from 1227.00 to 1811.00
>   help, /str, wgrid
>

> Here is where we are trying to interpolate:
>
> linterp, w1a, f1a, wgrid, fint1a
> linterp, w1b, f2b, wgrid, fint1b
> linterp, w2a, f2a, wgrid, fint2a
>
> ..... etc through 8
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>
> % Compiled module: INTERPOLATEDSIXTEEN.
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> Unsigned(i*4) int*8 Unsigned(i*8)
>
> Do we need to do something to our wgrid or to the interpolate command
> to get it to work?
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> Also, in each of our 8 data sets, there is an increment of wavelength
> values where the value of the flux is 0, which will make the average
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> goes through all of the wgrid values and averages the values of the
> interpolated flux values, but skips the flux values that are 0 and
> continues to the next? Is there a skip command? Would a where command
> work the best?
>
> Here is what I started with :
> for i=1227.00, (1227.00+58400*.01), 0.01 do ???

It seems to be complaining that wgrid is undefined. Can you show us the
code a little more specifically? From what you've said, I wouldn't
expect it to be undefined, so I suspect that there's something more
subtle happening within your code.

-Jeremy.

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a

value yet average others
Posted by Nikola on Sun, 14 Aug 2011 08:49:27 GMT
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It seems like you haven't defined wgrid in the procedure
interpolatedsixteen.pro.

linterp is not a standard idl function. Why not use interpol instead
(for the difference see the header of linterp.pro)?

> Also, in each of our 8 data sets, there is an increment of wavelength
> values where the value of the flux is 0, which will make the average
> of all 8 messed up. Do you have any ideas how to write a loop that
> goes through all of the wgrid values and averages the values of the
> interpolated flux values, but skips the flux values that are 0 and
> continues to the next? Is there a skip command? Would a where command
> work the best?

If you need to find mean of an array excluding elements equal to some
variable x (in your case x = 0) you don't need a loop. Just do

mask = array NE x
y = TOTAL(array*mask)/TOTAL(mask)

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Emily Anne Moravec on Sun, 14 Aug 2011 19:42:25 GMT
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On Aug 12, 7:26 pm, Jeremy Bailin <astroco...@gmail.com> wrote:
> On 8/12/11 4:26 PM, Emily Anne Moravec wrote:
>
>
>
>
>
>> We are writing a program for our supervisor to take 8 spectra which
>> are each a matrix of 16384 by 2. The part of the program we have
>> already splits the matrices into single matrices. Which is the code
>> below:
>
>> fitfilename1 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
>> files/lbgu19010_x1dsum.fits'
>> data1 = mrdfits(fitfilename1,1,hdr)
>> w1 = data1.wavelength
>> w1a=w1(*, 0)

>>   w1b=w1(*, 1)
>>   f1= data1.flux
>>   f1a=f1(*, 0)
>>   f1b=f1(*, 1)
>> .... etc. through 8
>
>> Then we must get a new graph with a span of wavelengths and
>> interpolated flux values.
>> Here is the wavelength grid for the eventual interpolation:
>
>> wgrid=findgen(58400)*.01+1227 ; from 1227.00 to 1811.00
>>   help, /str, wgrid
>
>> Here is where we are trying to interpolate:
>
>>   linterp, w1a, f1a, wgrid, fint1a
>>   linterp, w1b, f2b, wgrid, fint1b
>>   linterp, w2a, f2a, wgrid, fint2a
>
>> ..... etc through 8
>> But we get this error.
>
>> % Compiled module: INTERPOLATEDSIXTEEN.
>> MRDFITS: Binary table. 12 columns by 2 rows.
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>>   Parameter 3 (New X Vector or Scalar) of routine LINTERP is
>> undefined.
>> Valid dimensions are: scalar 1
>> Valid types are: byte int*2 int*4 real*4 real*8 Unsigned(i*2)
>> Unsigned(i*4) int*8 Unsigned(i*8)
>
>> Do we need to do something to our wgrid or to the interpolate command
>> to get it to work?
>
>> Also, in each of our 8 data sets, there is an increment of wavelength
>> values where the value of the flux is 0, which will make the average
>> of all 8 messed up. Do you have any ideas how to write a loop that
>> goes through all of the wgrid values and averages the values of the
>> interpolated flux values, but skips the flux values that are 0 and
>> continues to the next? Is there a skip command? Would a where command
>> work the best?
>

>> Here is what I started with :
>> for i=1227.00, (1227.00+58400*.01), 0.01 do ???
>
> It seems to be complaining that wgrid is undefined. Can you show us the
> code a little more specifically? From what you've said, I wouldn't
> expect it to be undefined, so I suspect that there's something more
> subtle happening within your code.
>
> -Jeremy.

Here is my entire code.

```
pro interpolatedsixteen
 ; this takes the date from each column of the data, making it so that
they are 1-column arrays and can be easily graphed, then it will
interpolate the data
 ; onto a comprehensive graph
  fitfilename1 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19010_x1dsum.fits'
  data1 = mrdfits(fitfilename1,1,hdr)
  w1 = data1.wavelength
  w1a=w1(*, 0)
  w1b=w1(*, 1)
  f1= data1.flux
  f1a=f1(*, 0)
  f1b=f1(*, 1)

  fitfilename2 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19020_x1dsum.fits'
  data2= mrdfits(fitfilename2,1,hdr)
  w2 = data2.wavelength
  w2a=w2(*, 0)
  w2b=w2(*, 1)
  f2= data2.flux
  f2a=f2(*, 0)
  f2b=f2(*, 1)

  fitfilename3 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19030_x1dsum.fits'
  data3= mrdfits(fitfilename3,1,hdr)
  w3 = data3.wavelength
  w3a=w3(*, 0)
  w3b=w3(*, 1)
  f3= data3.flux
  f3a=f3(*, 0)
  f3b=f3(*, 1)

  fitfilename4 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
```

```
files/lbgu19040_x1dsum.fits'
  data4= mrdfits(fitfilename4,1,hdr)
  w4 = data4.wavelength
  w4a=w4(*, 0)
  w4b=w4(*, 1)
  f4= data4.flux
  f4a=f4(*, 0)
  f4b=f4(*, 1)

  fitfilename5 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19050_x1dsum.fits'
  data5= mrdfits(fitfilename5,1,hdr)
  w5 = data5.wavelength
  w5a=w5(*, 0)
  w5b=w5(*, 1)
  f5= data5.flux
  f5a=f5(*, 0)
  f5b=f5(*, 1)

  fitfilename6 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19060_x1dsum.fits'
  data6 = mrdfits(fitfilename6,1,hdr)
  w6 = data6.wavelength
  w6a=w6(*, 0)
  w6b=w6(*, 1)
  f6= data6.flux
  f6a=f6(*, 0)
  f6b=f6(*, 1)

  fitfilename7 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19070_x1dsum.fits'
  data7= mrdfits(fitfilename7,1,hdr)
  w7 = data7.wavelength
  w7a=w7(*, 0)
  w7b=w7(*, 1)
  f7= data7.flux
  f7a=f7(*, 0)
  f7b=f7(*, 1)

  fitfilename8 = '/Users/quasargroup/NGC3783/NGC3783 new data/X1dsum
files/lbgu19080_x1dsum.fits'
  data8= mrdfits(fitfilename8,1,hdr)
  w8 = data8.wavelength
  w8a=w8(*, 0)
  w8b=w8(*, 1)
  f8= data8.flux
  f8a=f8(*, 0)
  f8b=f8(*, 1)
```

```
wgrid=findgen(58400)*.01+1227  ; from 1227.00 to 1811.00
help, /str, wgrid

linterp, w1a, f1a, wgrid, fint1a
linterp, w1b, f2b, wgrid, fint1b
linterp, w2a, f2a, wgrid, fint2a
linterp, w2b, f2b, wgrid, fint2b
linterp, w3a, f3a, wgrid, fint3a
linterp, w3b, f3b, wgrid, fint3b
linterp, w4a, f4a, wgrid, fint4a
linterp, w4b, f4b, wgrid, fint4b
linterp, w5a, f5a, wgrid, fint5a
linterp, w5b, f5b, wgrid, fint5b
linterp, w6a, f6a, wgird, fint6a
linterp, w6b, f6b, wgird, fint6b
linterp, w7a, f7a, wgird, fint7a
linterp, w7b, f7b, wgrid, fint7b
linterp, w8a, f8a, wgrid, fint8a
linterp, w8b, f8b, wgrid, fint8b

;for i=1227.00, (1227.00+58400*.01), 0.01 do
 ; if fint
```

I thought findgen would make wgrid defined because the findgen makes a number.
Thanks for your time!!!

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Emily Anne Moravec on Sun, 14 Aug 2011 19:47:13 GMT
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On Aug 14, 3:49 am, Nikola <nikola.vi...@gmail.com> wrote:
> It seems like you haven't defined wgrid in the procedure
> interpolatedsixteen.pro.
>
> linterp is not a standard idl function. Why not use interpol instead
> (for the difference see the header of linterp.pro)?
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>> continues to the next? Is there a skip command? Would a where command
>> work the best?

>
> If you need to find mean of an array excluding elements equal to some
> variable x (in your case x = 0) you don't need a loop. Just do
>
> mask = array NE x
> y = TOTAL(array*mask)/TOTAL(mask)

So the mask = array NE x will exclude the x value?
What do I put in place of array? One value or all of the values 16
values I am averaging? Is NE the command for excluding something?
Thank you for you time!!!

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by wlandsman on Sun, 14 Aug 2011 20:21:09 GMT
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On Sunday, August 14, 2011 3:42:25 PM UTC-4, Emily Anne Moravec wrote:
> On Aug 12, 7:26 pm, Jeremy Bailin <astro...@gmail.com> wrote:

> linterp, w6a, f6a, wgird, fint6a
> linterp, w6b, f6b, wgird, fint6b
> linterp, w7a, f7a, wgird, fint7a
>
>
> I thought findgen would make wgrid defined because the findgen makes a
> number.
> Thanks for your time!!!

It would make wgrid defined, but not wgird. ;-) Wayne

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Emily Anne Moravec on Sun, 14 Aug 2011 20:26:32 GMT
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On Aug 14, 2:47 pm, Emily Anne Moravec <mora...@stolaf.edu> wrote:
> On Aug 14, 3:49 am, Nikola <nikola.vi...@gmail.com> wrote:
>
>
>
>
>
>> It seems like you haven't defined wgrid in the procedure
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>
>> linterp is not a standard idl function. Why not use interpol instead
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>>> continues to the next? Is there a skip command? Would a where command
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>> If you need to find mean of an array excluding elements equal to some
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>
> So the mask = array NE x will exclude the x value?
> What do I put in place of array? One value or all of the values 16
> values I am averaging? Is NE the command for excluding something?
> Thank you for you time!!!

Also, I just looked at linterp and interpol and it seems linterp is
exactly what we want to do. I really also don't see the difference
between them.
To linearly interpolate from a spectrum wavelength-flux pair
; WAVE, FLUX to another wavelength grid defined as:
; WGRID = [1540., 1541., 1542., 1543., 1544, 1545.]
;
; IDL> LINTERP, WAVE, FLUX, WGRID, FGRID
;
; FGRID will be a 6 element vector containing the values of
FLUX
; linearly interpolated onto the WGRID wavelength scale
This is exactly what we want to do…...

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Jeremy Bailin on Sun, 14 Aug 2011 21:16:53 GMT
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On 8/14/11 4:21 PM, wlandsman wrote:
> On Sunday, August 14, 2011 3:42:25 PM UTC-4, Emily Anne Moravec wrote:
>> On Aug 12, 7:26 pm, Jeremy Bailin<astro...@gmail.com> wrote:
>
>> linterp, w6a, f6a, wgird, fint6a

>> linterp, w6b, f6b, wgird, fint6b
>> linterp, w7a, f7a, wgird, fint7a
>>
>>
>> I thought findgen would make wgrid defined because the findgen makes a
>> number.
>> Thanks for your time!!!
>
> It would make wgrid defined, but not wgird. ;-) Wayne

I think we have a winner. :-)=

-Jeremy.

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by wlandsman on Mon, 15 Aug 2011 00:09:05 GMT
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On Sunday, August 14, 2011 4:21:09 PM UTC-4, wlandsman wrote:

>
> It would make wgrid defined, but not wgird. ;-) Wayne

I was about to write that a clue to identifying the typo would have been to look at the line number of the error message, which would have told you that the first calls to LINTERP were successful, so that there was something different about the LINTERP call that was giving an error.

But then I realized that LINTERP uses a very old (1980s) error checking routine "zparcheck" which overrides the normal IDL traceback, so you weren't seeing the line number. I've added an HELP,/TRACEBACK to zparcheck. Someday, I will update the error checking methods in the astrolib, but I haven't found any error checking schemes yet that I am happy with. --Wayne

---

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Nikola on Mon, 15 Aug 2011 08:17:49 GMT
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On Aug 14, 3:47 pm, Emily Anne Moravec <mora...@stolaf.edu> wrote:
> On Aug 14, 3:49 am, Nikola <nikola.vi...@gmail.com> wrote:
>
>
>
>> It seems like you haven't defined wgrid in the procedure
>> interpolatedsixteen.pro.

>
>> linterp is not a standard idl function. Why not use interpol instead
>> (for the difference see the header of linterp.pro)?
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>> If you need to find mean of an array excluding elements equal to some
>> variable x (in your case x = 0) you don't need a loop. Just do
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>> mask = array NE x
>> y = TOTAL(array*mask)/TOTAL(mask)
>
> So the mask = array NE x will exclude the x value?
> What do I put in place of array? One value or all of the values 16
> values I am averaging? Is NE the command for excluding something?
> Thank you for you time!!!

NE means Not Equal

So,
mask = array NE x
makes a new array of the same size as array, but with 1 where array is
not equal x and with zero in the opposite case. In place of array you
put the array you wish to average.

If you're going to use IDL extensively, I strongly recommend you to
read the part of the manual on arrays.

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Emily Anne Moravec on Wed, 17 Aug 2011 15:33:36 GMT
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On Aug 14, 4:16 pm, Jeremy Bailin <astroco...@gmail.com> wrote:
> On 8/14/11 4:21 PM, wlandsman wrote:
>
>> On Sunday, August 14, 2011 3:42:25 PM UTC-4, Emily Anne Moravec wrote:
>>> On Aug 12, 7:26 pm, Jeremy Bailin<astro...@gmail.com> wrote:
>
>>> linterp, w6a, f6a, wgird, fint6a
>>> linterp, w6b, f6b, wgird, fint6b

>>> linterp, w7a, f7a, wgird, fint7a
>
>>> I thought findgen would make wgrid defined because the findgen makes a
>>> number.
>>> Thanks for your time!!!
>
>> It would make wgrid defined, but not wgird. ;-) Wayne
>
> I think we have a winner. :-)=
>
> -Jeremy.

oh man… thanks. why does this always happen?

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Brian Wolven on Wed, 17 Aug 2011 15:43:58 GMT
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On Wednesday, August 17, 2011 11:33:36 AM UTC-4, Emily Anne Moravec wrote:

> oh man… thanks. why does this always happen?

Computers insist on doing what you say, rather than what you mean. =P

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by Emily Anne Moravec on Wed, 17 Aug 2011 16:10:39 GMT
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On Aug 14, 7:09 pm, wlandsman <wlands...@gmail.com> wrote:
> On Sunday, August 14, 2011 4:21:09 PM UTC-4, wlandsman wrote:
>
>> It would make wgrid defined, but not wgird. ;-) Wayne
>
> I was about to write that a clue to identifying the typo would have been to look at the line number of the error message, which would have told you that the first calls to LINTERP were successful, so that there was something different about the LINTERP call that was giving an error.
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First of all, I feel rather silly.

But I have another question and it isn't just for apparent proof reading.
We are trying to remove some values of our spectra that are equal to 0, but by using the remove command it literally removes the values where the flux is equal to 0 which is what it is supposed to do, but the problem with that is that when those values are remove the whole graph then moves which will mess up our final result. Is there a command that will take out the values equal to zero, but leave the graph where it is?

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by David Fanning on Wed, 17 Aug 2011 16:17:00 GMT
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Emily Anne Moravec writes:

> We are trying to remove some values of our spectra that are equal to
> 0, but by using the remove command it literally removes the values
> where the flux is equal to 0 which is what it is supposed to do, but
> the problem with that is that when those values are remove the whole
> graph then moves which will mess up our final result. Is there a
> command that will take out the values equal to zero, but leave the
> graph where it is?

Are you looking for something like this, where there
are gaps in the plot where the data goes to zero:

```
IDL> data = randomu(-3L, 100)*10
IDL> zeros = Long(randomu(-2L, 5)*100)
IDL> data[zeros] = 0
IDL> plot, data, min_value=0.1
```

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others

Posted by Michael Galloy on Wed, 17 Aug 2011 16:35:45 GMT
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On 8/17/11 10:17 AM, David Fanning wrote:
> Emily Anne Moravec writes:
>
>> We are trying to remove some values of our spectra that are equal to
>> 0, but by using the remove command it literally removes the values
>> where the flux is equal to 0 which is what it is supposed to do, but
>> the problem with that is that when those values are remove the whole
>> graph then moves which will mess up our final result. Is there a
>> command that will take out the values equal to zero, but leave the
>> graph where it is?
>
> Are you looking for something like this, where there
> are gaps in the plot where the data goes to zero:
>
> IDL> data = randomu(-3L, 100)*10
> IDL> zeros = Long(randomu(-2L, 5)*100)
> IDL> data[zeros] = 0
> IDL> plot, data, min_value=0.1

Setting invalid values to !values.f_nan also works nicely for regular line plots (though it can make related computations a bit more complicated, with extra NAN keywords and the FINITE routine coming in handy).

Mike
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Subject: Re: difficulty using "linterp" command - need help making loop to exclude a value yet average others
Posted by wlandsman on Wed, 17 Aug 2011 16:57:30 GMT
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I am just guessing what you mean by "leave the graph where it is" but note that you need to remove the zero values from both the wavelength and flux vectors. So, applying the idlastro procedure remove.pro to your wavelength, w, and flux, f, vectors:

```
g = where(f eq 0,Ng)    ;Find locations of zero values in flux vector
if Ng gt 0 then remove,g,w,f    ;Remove these locations from both wavelength & flux vectors
```

On Wednesday, August 17, 2011 12:10:39 PM UTC-4, Emily Anne Moravec wrote:

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