Subject: Derivative along one dimension of a data cube?
Posted by Ryan[1] on Sat, 28 Jul 2007 16:30:07 GMT
View Forum Message <> Reply to Message

Hi folks,
I am working with some hyperspectral images and would like to take the derivative of all the spectra in the cube. Is there a faster way to do this than looping through the x,y dimensions and calling deriv on every individual wavelength dimension?

Thanks!
Ryan

Subject: Re: Derivative
Posted by Vince Hradil on Tue, 01 Jul 2008 19:05:38 GMT
View Forum Message <> Reply to Message

On Jul 1, 1:58 pm, w...@bao.ac.cn wrote:
> I have a 2-D array (a image) A. I want to know its partial
> derivatives along X direction and Y direction.
> dA(x,y)/dx=B
> dA(x,y)/dy=C
> B and C should also be 2-D array.
> I want to know if IDL has some function or operator can do this job
> directly.
> If it has not those I wanted, then I must write some program according
> to "Spline and Lagrange".
> I am not a foolish boy. But I am a lazy boy.
> Who can tell me if IDL can do this job for me?
> Thanks!

have you tried deriv()? Have you tried:
IDL> ?

Subject: Re: Derivative
Posted by wxf on Tue, 01 Jul 2008 19:11:57 GMT
View Forum Message <> Reply to Message

On Jul 2, 3:05 am, Vince Hradil <hrad...@yahoo.com> wrote:
> On Jul 1, 1:58 pm, w...@bao.ac.cn wrote:
>
>> I have a 2-D array (a image) A. I want to know its partial
>> derivatives along X direction and Y direction.
>> dA(x,y)/dx=B
>> dA(x,y)/dy=C

>> B and C should also be 2-D array.
>> I want to know if IDL has some function or operator can do this job
>> directly.
>> If it has not those I wanted, then I must write some program according
>> to "Spline and Lagrange".
>> I am not a foolish boy. But I am a lazy boy.
>> Who can tell me if IDL can do this job for me?
>> Thanks!
>
> have you tried deriv()? Have you tried:
> IDL> ?

yes,I have used deriv() before.But it only works for one dimension.
If I use it to differentiate a 2-D image along one direction, then I
must use "for i= , do begin .....endfor". That is too slow.
Could you give me more hints?

Subject: Re: Derivative
Posted by Vince Hradil on Tue, 01 Jul 2008 19:36:13 GMT
View Forum Message <> Reply to Message

On Jul 1, 2:11 pm, w...@bao.ac.cn wrote:
> On Jul 2, 3:05 am, Vince Hradil <hrad...@yahoo.com> wrote:
>
>
>
>> On Jul 1, 1:58 pm, w...@bao.ac.cn wrote:
>
>>> I have a 2-D array (a image) A. I want to know its partial
>>> derivatives along X direction and Y direction.
>>> dA(x,y)/dx=B
>>> dA(x,y)/dy=C
>>> B and C should also be 2-D array.
>>> I want to know if IDL has some function or operator can do this job
>>> directly.
>>> If it has not those I wanted, then I must write some program according
>>> to "Spline and Lagrange".
>>> I am not a foolish boy. But I am a lazy boy.
>>> Who can tell me if IDL can do this job for me?
>>> Thanks!
>
>> have you tried deriv()? Have you tried:
>> IDL> ?
>
> yes,I have used deriv() before.But it only works for one dimension.
> If I use it to differentiate a 2-D image along one direction, then I
> must use "for i= , do begin .....endfor". That is too slow.

> Could you give me more hints?

Ahh... sorry - I was in a bad mood.

This is what I've done (as part of a Canny routine, btw):

```
isize = size(image,/dimensions)
ncol = isize[0]
nrow = isize[1]
grad = fltarr(ncol,nrow,4)
filter = double([ [-1,-2,-3,-2,-1], [0,0,0,0,0], [1,2,3,2,1] ])
grad[*,*,0] = convol(image,transpose(filter),/center,/edge_truncate) ;
Horizontal
grad[*,*,1] = convol(image,filter,/center,/edge_truncate) ; Vertical
grad[*,*,2] = sqrt( grad[*,*,0]^2 + grad[*,*,1]^2 ) ; Magnitude
grad[*,*,3] = atan( grad[*,*,1], grad[*,*,0] ) ; Direction
```

I hope this helps you get started. I might have horiz/vert
reversed... it's been a while since I actually used this 8^)