Subject: derivative function in IDL similar as DIFF in matlab
Posted by Jie Zhou on Tue, 12 Nov 2013 10:08:11 GMT
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Is there a derivative function in IDL similar as DIFF in matlab? I think the DERIV is different from DIFF.

Subject: Re: derivative function in IDL similar as DIFF in matlab
Posted by lecacheux.alain on Tue, 12 Nov 2013 10:27:24 GMT
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Le mardi 12 novembre 2013 11:08:11 UTC+1, Jie Zhou a écrit :
> Is there a derivative function in IDL similar as DIFF in matlab? I think the DERIV is different from DIFF.

The DERIV function in IDL uses a second order formula for the discrete differenciation (known as 3-point Lagrange interpolation). Afaik, Matlab DIFF computes a simple difference given, in IDL, by x - shift(x,1), where x is your data series.
alx.

Subject: Re: derivative function in IDL similar as DIFF in matlab
Posted by Matthew Argall on Tue, 12 Nov 2013 12:01:15 GMT
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On Tuesday, November 12, 2013 5:08:11 AM UTC-5, Jie Zhou wrote:
> Is there a derivative function in IDL similar as DIFF in matlab? I think the DERIV is different from DIFF.

TS_DIFF(data, 1) would be equivalent.

Subject: Re: derivative function in IDL similar as DIFF in matlab
Posted by lecacheux.alain on Tue, 12 Nov 2013 12:07:56 GMT
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Le mardi 12 novembre 2013 13:01:15 UTC+1, Matthew Argall a écrit :
> On Tuesday, November 12, 2013 5:08:11 AM UTC-5, Jie Zhou wrote:
>
>> Is there a derivative function in IDL similar as DIFF in matlab? I think the DERIV is different from DIFF.
>
>
>
> TS_DIFF(data, 1) would be equivalent.

TS_DIFF(data, 1) is simply doing a shift by one (i.e. data - shift(data, 1)), but by using a for loop!
alx.

Subject: Re: derivative function in IDL similar as DIFF in matlab
Posted by Matthew Argall on Tue, 12 Nov 2013 12:08:10 GMT
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On Tuesday, November 12, 2013 7:01:15 AM UTC-5, Matthew Argall wrote:
> On Tuesday, November 12, 2013 5:08:11 AM UTC-5, Jie Zhou wrote:
>
>> Is there a derivative function in IDL similar as DIFF in matlab? I think the DERIV is different from DIFF.
>
>
>
> TS_DIFF(data, 1) would be equivalent.

Actually, maybe not. TS_DIFF calculates the forward difference. I think you are looking for the backward difference.

In that case, I tend to use

result = data[1:*] - data[0:n_elements(data)-1]

or

result = shift(data, 1) - data
result = result[0:n_elements(result)-1]

Subject: Re: derivative function in IDL similar as DIFF in matlab
Posted by Jie Zhou on Tue, 12 Nov 2013 12:18:01 GMT
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On Tuesday, November 12, 2013 1:08:10 PM UTC+1, Matthew Argall wrote:
> On Tuesday, November 12, 2013 7:01:15 AM UTC-5, Matthew Argall wrote:
>
>> On Tuesday, November 12, 2013 5:08:11 AM UTC-5, Jie Zhou wrote:
>
>>
>
>>> Is there a derivative function in IDL similar as DIFF in matlab? I think the DERIV is different from DIFF.
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> In that case, I tend to use
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>
> result = data[1:*] - data[0:n_elements(data)-1]
>
>
>
> or
>
>
>
> result = shift(data, 1) - data
>
> result = result[0:n_elements(result)-1]

In fact what I tried to do is using diff function to calculate the n-th derivative of an 2-d matrix. for example, for a matrx:
A=

1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	1

in matlab, the DIFF(A,2) gives:

1	-2	1	0	0	0	0	0	0	0
0	1	-2	1	0	0	0	0	0	0
0	0	1	-2	1	0	0	0	0	0
0	0	0	1	-2	1	0	0	0	0

```
 0  0  0  0  1 -2  1  0  0  0
 0  0  0  0  0  1 -2  1  0  0
 0  0  0  0  0  0  1 -2  1  0
 0  0  0  0  0  0  0  1 -2  1
```

Until now, I don't find a equivalent function in IDL.
Thanks to alx, I use
D=(shift(shift(A,0,1)-A,0,1)-(shift(A,0,1)-A))[*,2:*]
to finish the task.

jie

Subject: Re: derivative function in IDL similar as DIFF in matlab
Posted by Matthew Argall on Tue, 12 Nov 2013 14:07:29 GMT
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> D=(shift(shift(A,0,1)-A,0,1)-(shift(A,0,1)-A))[*,2:*]

print, (Shift_Diff(Shift_Diff(A, DIRECTION=1, /EDGE_WRAP), DIRECTION=1, /EDGE_WRAP))[*,2:*]
