
Subject: Re: Differentiation in IDL
Posted by [Wox](#) on Mon, 16 Oct 2006 13:54:27 GMT
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Specify x?

```
dx = DERIV(x * !dtor,data)
```

On Mon, 16 Oct 2006 07:49:21 -0600, David Fanning <news@dfanning.com> wrote:

```
> Folks,  
>  
> OK, I'm missing something crucial here.  
>  
> Suppose I have a sine function:  
>  
> x = Findgen(360)  
> data = Sin(x * !dtor)  
> Plot, data  
>  
> I know that d/dx(sin(x)) = cos(x). So, I would expect  
> a cosine looking curve if I differentiate the data above.  
>  
> dx = DERIV(data)  
> OPlot, dx, Linestyle=2  
>  
> The differentiated curve is almost a straight line! One  
> could argue that it might have the correct cosine *shape*  
> (squint your eyes a little bit), but the scale is vastly  
> different. How come?  
>  
> Cheers,  
>  
> David
```

Subject: Re: Differentiation in IDL
Posted by [David Fanning](#) on Mon, 16 Oct 2006 13:56:41 GMT
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Wox writes:

```
> Specify x?  
>  
> dx = DERIV(x * !dtor,data)
```

Oh, sorry.

```
x = findgen(360)
```

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Differentiation in IDL

Posted by [David Fanning](#) on Mon, 16 Oct 2006 13:59:02 GMT

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David Fanning writes:

> Wox writes:

>

>> Specify x?

>>

>> dx = DERIV(x * !dtor,data)

>

> Oh, sorry.

>

> x = findgen(360)

>

> David

>

Oh, sorry. I misunderstood. Yes, this does it. Thank you!

David

--

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Subject: Re: Differentiation in IDL

Posted by [Braedley](#) on Mon, 16 Oct 2006 14:15:06 GMT

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Also, $d/dx(f(g(x))) = f'(g(x)) * g'(x)$ (chain rule), so in your case,
 $d/dx(\sin(x * !dtor)) = \cos(x * !dtor) * !dtor$

If you divide the result from DERIV by !dtor, you'll get the result you're looking for. My suggestion would be to declare x as
x=findgen(360)*!dtor
to begin with.

Cheers

David Fanning wrote:

> David Fanning writes:

>

>> Wox writes:

>>

>>> Specify x?

>>>

>>> dx = DERIV(x * !dtor,data)

>>

>> Oh, sorry.

>>

>> x = findgen(360)

>>

>> David

>>

>

> Oh, sorry. I misunderstood. Yes, this does it. Thank you!

>

> David

> --

> David Fanning, Ph.D.

> Fanning Software Consulting, Inc.

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> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Differentiation in IDL

Posted by [Allan Whiteford](#) on Mon, 16 Oct 2006 14:26:26 GMT

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Dear All,

Surely when you type:

dx = DERIV(x * !dtor,data)

you're actually doing:

d/d(x*!dtor) (sin(x*!dtor))

which is:

$\cos(x * !dtor)$

i.e. you shouldn't need to divide the result by !dtor.

Of course, declaring x as $\text{findgen}(360) * !dtor$ to start with looks a lot cleaner and is probably easier to follow, but I don't think what was suggested by Wox gives the wrong answer.

Thanks,

Allan

Braedley wrote:

> Also, $d/dx(f(g(x))) = f'(g(x)) * g'(x)$ (chain rule), so in your case,
> $d/dx(\sin(x * !dtor)) = \cos(x * !dtor) * !dtor$
> If you divide the result from DERIV by !dtor, you'll get the result
> you're looking for. My suggestion would be to declare x as
> $x = \text{findgen}(360) * !dtor$
> to begin with.

>

> Cheers

>

>

> David Fanning wrote:

>

>> David Fanning writes:

>>

>>

>>> Wox writes:

>>>

>>>

>>>> Specify x?

>>>>

>>>> $dx = \text{DERIV}(x * !dtor, data)$

>>>

>>> Oh, sorry.

>>>

>>> $x = \text{findgen}(360)$

>>>

>>> David

>>>

>>

>> Oh, sorry. I misunderstood. Yes, this does it. Thank you!

>>

>> David

>> --

>> David Fanning, Ph.D.
>> Fanning Software Consulting, Inc.
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>
>

Subject: Re: Differentiation in IDL
Posted by [David Fanning](#) on Mon, 16 Oct 2006 14:31:59 GMT
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Allan Whiteford writes:

> Surely when you type:
>
> dx = DERIV(x * !dtor,data)
>
> you're actually doing:
>
> d/d(x*!dtor) (sin(x*!dtor))
>
> which is:
>
> cos(x*!dtor)
>
> i.e. you shouldn't need to divide the result by !dtor.
>
> Of course, declaring x as findgen(360)*!dtor to start with looks a lot
> cleaner and is probably easier to follow, but I don't think what was
> suggested by Wox gives the wrong answer.

I think Bradley was suggesting an alternative way
of getting to the same answer. And, indeed it does.
His explanation adds insight to the original problem.

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
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Sepore ma de ni thui. ("Perhaps thou speakest truth.")
