
Subject: Re: A problem using IDL?

Posted by [pgrigis](#) on Thu, 01 May 2008 14:49:05 GMT

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If you want a meaningful plot of a sinusoidal function, you should make sure that you have enough data points (say, at least 10) in each cycle (period) of the function. If this condition is not fulfilled, the plot will look strange.

Cheers,
Paolo

chih...@sohu.com wrote:

> I used idl to write the following:

>

> window,xsize=800,ysize=400

> min=0

> max=100

> n=200

> x=fltarr(n+1)

> for i=0,n do x[i]=min+double(i)*(max-min)/n

> print,x

> y=sin(2*3.141593*x)

> plot,x,y

>

> When n=100 or n=200,the graph is wrong. When n >=300,it's OK.Can

> someone tell me why?

Subject: Re: A problem using IDL?

Posted by [Vince Hradil](#) on Thu, 01 May 2008 15:41:16 GMT

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On May 1, 9:49 am, pgri...@gmail.com wrote:

> If you want a meaningful plot of a sinusoidal function,

> you should make sure that you have enough data

> points (say, at least 10) in each cycle (period) of the function.

> If this condition is not fulfilled, the plot will look strange.

>

> Cheers,

> Paolochih...@sohu.com wrote:

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>

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>> When n=100 or n=200,the graph is wrong. When n >=300,it's OK.Can
>> someone tell me why?
```

Also, combined with: http://www.dfanning.com/math_tips/sky_is_falling.html

Subject: Re: A problem using IDL?

Posted by [R.G. Stockwell](#) on Fri, 02 May 2008 16:16:52 GMT

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<chihuyu@sohu.com> wrote in message
news:337cf67f-424c-4bd8-8340-7ec7d0a121a5@l25g2000prd.google groups.com...

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```
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>
> When n=100 or n=200,the graph is wrong. When n >=300,it's OK.Can
> someone tell me why?
```

You are aliased. Definitely read up on it if you are not familiar with aliasing, as it is quite important in spectral analysis. Also read up on nyquist frequency.

you can write a sinusoid as

$$y = \sin(2 * \text{Pi} * f / \text{length} * x)$$

to explicitly have your frequency in there.

Also, check out this code which explicitly shows the aliasing.

```
window,xsize=800,ysize=400
```

```
min=0
max=100
n=100
x=fltarr(n+1)
for i=0,n do x[i]=min+double(i)*(max-min)/n
;print,x
y=sin(2*3.141593*x)
```

```
!P.multi=[0,1,2]
```

```
plot,x,y,psym=-4,xr=[0,10]
x1 = x
y1 = y
```

```
n=500
x=fltarr(n+1)
for i=0,n do x[i]=min+double(i)*(max-min)/n
;print,x
y=sin(2*3.141593*x)
```

```
plot,x,y,psym=-4,xr=[0,10]
oplot,x1,y1,psym=6,thick=4
```

Subject: Re: A problem using IDL?
Posted by [R.G. Stockwell](#) on Fri, 02 May 2008 16:20:31 GMT
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a bit better code. The top plot is the aliased signal.
The bottom shows the well sampled (not aliased) signal, which
is sampled much more finely. The thick squares show the aliased
signal from the top plot.

```
window,xsize=800,ysize=400
min=0
max=100
n=205
x=fltarr(n+1)
for i=0,n do x[i]=min+double(i)*(max-min)/n
;print,x
```

```
y=sin(2*3.141593*x)
```

```
!P.multi=[0,1,2]
```

```
plot,x,y,psym=-4,xr=[0,10]
```

```
x1 = x
```

```
y1 = y
```

```
n=205*8
```

```
x=fltarr(n+1)
```

```
for i=0,n do x[i]=min+double(i)*(max-min)/n
```

```
;print,x
```

```
y=sin(2*3.141593*x)
```

```
plot,x,y,psym=-4,xr=[0,10]
```

```
oplot,x1,y1,psym=6,thick=4
```

```
end
```
