Subject: Re: FFT wierdness in WAVE
Posted by Jackel on Thu, 28 Mar 1996 08:00:00 GMT
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In article <4jbl6k$2dp@news.tamu.edu> howie@skeefum.tamu.edu (Matt Howard) writes:
> Subject: FFT wierdness in WAVE

> Can anyone here enlighten me on why the plots produced with the
> following commands are so different?
[Text deleted]
>> plot,abs(fft(findgen(8395),-1)) - works!
>> plot,abs(fft(findgen(8396),-1)) - fails! Peaks where none should be.

A couple of versions ago, the IDL bug-fix notes mentioned a problem with FFT's when the length was not factorable into small primes. For example, of the two numbers in your example, the "fails" case does not factor well:

```
IDL> print,prime_factors(8396)
         2          2       2099
```

but the "works" case does (relatively speaking).

```
IDL> print,prime_factors(8395)
         5         23         73
```

(Note that this is also the reason why the first case takes much longer to compute.)

Since PV-Wave got their source from IDL quite a while ago, it seems likely that you're seeing the same problems. You can either hope that it gets fixed in the next version, or switch to IDL :)

Brian Jackel
University of Western Ontario

Subject: Re: FFT wierdness in WAVE
Posted by Sergei Senin on Thu, 28 Mar 1996 08:00:00 GMT
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It's me again :-)

howie@skeefum.tamu.edu (Matt Howard) wrote:
> Any ideas?

yet another one:

```
 ;------------------------------------------------------------ -----------
;weird_fft_2.pro start line
 ;------------------------------------------------------------ -----------
pro weird_fft_2
tek_color
out_old=0
for k=0, 10 do begin
if k eq 0 then plot_io ,abs(fft(findgen(2.^10.),-1)), $
xrange=[100,2.^10. ],   $
color=1, /nodata
ggg=strcompress(string(2^k))
xyouts, 0.2, 0.2, out_old, /norm, charsize=1.5, color=0
xyouts, 0.2, 0.2, ggg, /norm,  charsize=1.5, color=k+1
oplot,abs(fft(findgen(2^k),-1)), color=k+1
out_old=ggg
endfor
return
end
 ;------------------------------------------------------------ -----------
;weird_fft_2.pro stop line
 ;------------------------------------------------------------ -----------
```

Looks like good old "don't use number of samples other than power of 2 with this routine"

Subject: Re: FFT wierdness in WAVE
Posted by Sergei Senin on Thu, 28 Mar 1996 08:00:00 GMT
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howie@skeefum.tamu.edu (Matt Howard) wrote:
>
> Can anyone here enlighten me on why the plots produced with the
> following commands are so different?
>
> Other vector lengths which produce this strange behavior are;
>
> 5788 5788+16 5788+48
> 9848 9848-16 9848-32
> and others
>
>> plot,abs(fft(findgen(8395),-1)) - works!
>> plot,abs(fft(findgen(8396),-1)) - fails! Peaks where none should be.
>
> The contents of the vector do not matter. When the vector length is
> 8396 you get a spike on top of the proper spectrum.
>

> Any ideas?
>
>

Now I'm certain that I missed a couple of lectures on FFT when I was studying at the university :-(

Try this :

```
 ;------------------------------------------------------------ -----------
;weird_fft.pro start line
 ;------------------------------------------------------------ -----------
pro weird_fft
tek_color
out_old=0
for k=0, 10 do begin
if k eq 0 then plot_io ,abs(fft(findgen(8395),-1)), $
xrange=[-1000, 10000],   $
color=1, /nodata
ggg=strcompress(string(8395+k))
xyouts, 0.2, 0.2, out_old, /norm, charsize=1.5, color=0
xyouts, 0.2, 0.2, ggg, /norm,  charsize=1.5, color=k+1
oplot,abs(fft(findgen(8395+k),-1)), color=k+1
out_old=ggg
endfor
return
end
 ;------------------------------------------------------------ -----------
;weird_fft.pro stop line
 ;------------------------------------------------------------ -----------
```

--
Sergei Senin
ss@ee.port.ac.uk, http://www.ee.port.ac.uk:80/~ss-www/

Subject: Re: FFT wierdness in WAVE
Posted by Sergei Senin on Thu, 28 Mar 1996 08:00:00 GMT
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howie@skeefum.tamu.edu (Matt Howard) wrote (some text skipped -s.s.):
> Can anyone here enlighten me on why the plots produced with the
> following commands are so different?

>> plot,abs(fft(findgen(8395),-1)) - works!
>> plot,abs(fft(findgen(8396),-1)) - fails! Peaks where none should be.
> Any ideas?

I've noticed that it also takes WAVE much more time to calculate the one which fails

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