Subject: Re: mpfit of parametric data?
Posted by Paolo Grigis on Mon, 16 Aug 2004 15:36:06 GMT
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When you get your starting guess for the frequency (let's call it
guessfreq) from the FFT you should be able to use mpfitfun with
starting parameters, say, [1.,guessfreq,0.] and obtain a good fit...

```
IDL> dummy=max(abs(Ft_data),count)
IDL> guessfreq=freq[count]
IDL> print,guessfreq
      0.068664548

IDL> par=mpfitfun('yoursinusoid',t,data,errors,[1.,guessfreq,0.])

Iter      1   CHI-SQUARE =    1.0754572E+09
    P(0) =            1.00000
    P(1) =          0.0686645
    P(2) =            0.00000

[...]

Iter      7   CHI-SQUARE =    1.1268491E-23
    P(0) =         -0.0300000
    P(1) =          0.0692300
    P(2) =          -0.841593
```

You may obtain a negative amplitude and/or phase sometimes, but if
this bothers you, you can use the PARINFO structure in mpfitfun for
constraining them to positive values.

In this simple case it looks like you can fit your data
without needing good guesses on the amplitude or the phase.
But possibly more work is needed for the real data...

Ciao,
Paolo

jamiesmyth_uni@yahoo.ca wrote:
> After two weeks of vacation I'm back at this. I've de-trended the
> original time series by fitting to a quadratic, and estimated the
> frequencies of the components by looking at the power spectrum.
> Unfortunately, I still cannot fit the amplitude and phase of a trivial
> sinusoid such as 'A*sin(2*!dpi*w*t+phi)'. How do I go about estimating
> the phase of the following trivial example?
>
> IDL> n = 2048
> IDL> t = dindgen(n) * 0.125 ; time

> IDL> freq = dindgen(n)/(n*0.128)
> IDL> p0 = [0.03, 0.06923, 2.3]
> IDL> data = p0(0)*sin(2*!dpi*p0(1)*t + p0(2))
> IDL> plot, t, data
> IDL> Ft_data = fft(data)
> IDL> plot, freq, abs(Ft_data)^2, xrange=[0,0.5] ; frequency estimate
> IDL> plot, freq, atan(double(Ft_data),imaginary(Ft_data)),
> xrange=[0,0.5] ; ?phase estimate?
>
> I think I understand what Craig said about a local-minimum but I'm a
> little surprised that such a simple problem (i.e. estimating the
> amplitude, frequency and phase of a sine wave) would be so difficult?
> How is it that my Lecroy/Tektronix scope can solve this in real time
> but I cannot do it with IDL and a dual xeon? Surely I must be missing
> something...
>
> Any help is greatly appreciated!
> Jamie
>

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