
Subject: Re: Minimum and location of minimum through interpolation

Posted by [Russell\[1\]](#) on Mon, 30 Jan 2012 21:18:59 GMT

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On Jan 30, 10:26 am, Craig Markwardt <craig.markwa...@gmail.com> wrote:

> On Jan 30, 3:33 am, Els <elias.rous...@gmail.com> wrote:

>

>> Here is where the problem are:

>

>> Due to undersampling, the actual minimum standard deviation may occur between two x-values, so I want to determine this through interpolation. That is not so difficult, but one additional problem is that "x" is an angle, so I can have jumps from 360 deg to 0 deg. If the minimum is around eg. 358 deg and I have undersampling, interpolation may give me a result of ~180 deg, which is obviously wrong.

>

> You could try unwrapping your series first, for example by using
> PHUNWRAP, and then doing your minimum-finding procedure with the
> modified series.

>

> Craig

>

> <http://www.physics.wisc.edu/~craigm/idl/math.html#PHUNWRAP>

You could take the derivative of the std.dev. with respect to x and find the points where $ds/dx = 0$. Obviously, that'll never happen (for the undersampling issue you said), so instead interpolate that:

```
dstdx = deriv(x,std)
minx = interpol(x,dstdx,0.0)
```

Now, the catch is since there might be multiple extrema, you'll need to be careful with this, but shouldn't be too hard. You just need to find the points where the sign goes from negative to positive. If your sample is smallish (say <10000), then you can probably do this by a brute force search, and compare the sign of successive elements. Every time you find a sign flip (in the right sense to avoid local maxima), then log it. Next loop over the minima and do the above 2 lines.

Russell
