Re: Testable Predictions by HdB

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Dik T. Winter wrote:

> My implementation of your algorithm on both 5 points and 9 points does
> not even come close.

Of course it "does not". I wrote:

> You still don't get it. That stepsize is involved in an _integration_
> (or: a summation with a truncation error). It extends over a distance
> 2.2.pi.sigma where sigma = twice the sampling. Thus the "stepsize" in
> my Numerical Differentiation method contains at least 25 samples with
> weights ranging from 1/sqrt(2.pi) to zero.

Nevertheless you write:

> As an afterthought I implemented your algorithm on 17, 33 and 65 points.
> Increasing the number of points did increase the precision, except that
> an increase from 33 to 65 points had no effect. With exp(x) the optimal
> results are as follows:
>
	5 points	9 points	17 points	33 points	65 points
h	2^(0)	2^(−2)	2^(−6)	2^(−10)	2^(−10)
err	1.244e0	2.325e−1	3.335e−4	3.017e−6	3.017e−6

You must have at least 25 points. Otherwise the "tails" of the Gaussians
aren't neglectible < exp(−(2.pi)^2/2). And, of course, it's _impossible_
to improve on that 25 pts result with even more points, i.e. 33 or 65.

> Decreasing h beyond that figure indeed had bad effects on the precision.
> Just as I "predicted".

Worse. It's even possible to have an "underflow" with these Gaussians.
But you shouldn't do that. Just _calculate_ the number of points n
you (always) need, with: n = 2*Round(4.pi)+1 = 25 or so.

(For my program see:
<http://www.cwi.nl/~dik/private/deriv.c>.)

Yep. Got it. Unfortunately, we speak different computer languages as well, yours being C and mine being Pascal. I can read C , but I don't speak it (not fluently, at least). But I will take a closer look.

Han de Bruijn

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