Re: time−series smoothing

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From: Peter Spellucci (*spellucci_at_fb04373.mathematik.tu−darmstadt.de*)
Date: 03/18/05

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In article <iEGoNLAGYdOCFwWI@mcdowella.demon.co.uk>,
"A.G.McDowell" <mcdowella@mcdowella.demon.co.uk> writes:
>In article <4239ACF1.55B96907@ever.com>, Jake <wh@ever.com> writes
>>I have a problem of an apparent cross−disciplinary nature so I hope that
>>justifies the cross−posting.
>>
>(trimmed)
>>
>>2] Would it make sense to use Nelder−Mead (downhill simplex) method for
>>minimizing, even though this problem seems to be a constrained
>>optimization? There are three parameters, all constrained to positive
>>values and one constrained to integer values, so differentiation doesn't
>>seem to be an option. Is there a better derivative−free optimizer for
>>this problem? Is there a differentiation method that would work better,
>>even for a function that is only partially differentiable?
>>
>I note that the Nelder−Mean algorithm is mentioned in Numerical Recipes
>to need restarting in practice and is now known to sometimes fail to
>converge (google on Nelder simplex counter−example yields e.g.
>http://portal.acm.org/citation.cfm?id=589108: the body of the text
>requires a subscription, but the abstract is accessible to all). Torczon
>has provided a variety of convergence proofs for direct search
>algorithms, one of which looks like a variant of the Nelder−Mead
>algorithm: googling on Torczon Simplex yields http://www.cs.wm.edu/~va/r
>esearch/, which includes a paper "On the convergence of the
>multidirectional search algorithm".
>
>Are these methods destined to replace Nelder−Mead? Nice Theoretical
>curiosities? Something in between?
>−−
>A.G.McDowell

there are several convergent variants of Nelder Mead known now:

Zbl 0962.65048 Kelley, C.T.
Detection and remediation of stagnation in the Nelder−Mead algorithm
using a sufficient decrease condition. (English)

SIAM J. Optim. 10, No.1, 43−55 (1999).
(no guarantee of convergence though)

20. Zbl 1030.90122 Tseng, Paul
Fortified−descent simplicial search method: A general approach. (English)
SIAM J. Optim. 10, No.1, 269−288 (1999). MSC 2000:
(a mix of Torczon like steps with the Nelder Mead idea, in practice more
like a grid search)

Zbl pre01812445 Price, C.J.; Coope, I.D.; Byatt, D.
A convergent variant of the Nelder−−Mead algorithm. (English)
J. Optimization Theory Appl. 113, No.1, 5−19 (2002)
(with proof of convergence, only mnor modifications to the original nelder Mead)

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peter