Subject: Re: amoeba/mpfit/etc with a quantized variable?
Posted by Craig Markwardt on Fri, 27 Feb 2004 02:47:06 GMT
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henrygroe@yahoo.com (Henry Roe) writes:
> I've a function representing a physical phenomenon where some
> variables are continuous and some should be quantized as integers.
> It's not obvious to me how to force amoeba or mpfit or any of my other
> favorite minimization/fitting routines to only move certain variables
> in integer steps.
>
> Has anybody else run into this type of challenge? Any suggestions?

I'm not sure. One suggestion I have is to search in a grid of the
discrete values, and optimize the continuous variables at each grid
point. This is what is commonly done for chi-square fitting
confidence regions.

Craig

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Craig B. Markwardt, Ph.D. EMAIL: craigmnet@REMOVEcow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
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Subject: Re: amoeba/mpfit/etc with a quantized variable?
Posted by James Kuyper on Fri, 27 Feb 2004 16:20:25 GMT
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Craig Markwardt wrote:
>
> henrygroe@yahoo.com (Henry Roe) writes:
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>> variables are continuous and some should be quantized as integers.
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> I'm not sure. One suggestion I have is to search in a grid of the
> discrete values, and optimize the continuous variables at each grid
> point. This is what is commonly done for chi-square fitting
> confidence regions.

That's a great approach if the number of possible combions of values for

the discrete variables is small. If it isn't, then you're in the domain of combinatorial optimization. I'm not as up-to-date in this field as I'd like; the best method I'm aware of for combinatorial optimization is the Metropolis method, with simulated annealing. There are probably better references, but there's a decent description in section 10.9 of my 1988 copy of "Numerical Recipes in C". A google search with "Metropolis and annealing" gives 8150 results, with no obvious basis for choosing the best one.

Subject: Re: amoeba/mpfit/etc with a quantized variable?
Posted by David Fanning on Fri, 27 Feb 2004 16:40:37 GMT
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James Kuyper writes:

> A google search with
> "Metropolis and annealing" gives 8150 results, with no obvious basis for
> choosing the best one.

Geez, and on a Friday, too. We better get a keg. :-(

Cheers,

David

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David Fanning, Ph.D.
Fanning Software Consulting
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: amoeba/mpfit/etc with a quantized variable?
Posted by henrygroe on Mon, 01 Mar 2004 18:18:02 GMT
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Thanks all for the tips.

Thinking about it a bit more on Friday (before I saw the responses and pre-keg) I realized that I got lucky in that my 8-10 quantized variables have no interdependence (so, can be minimized for one at a time) and that the range of values I needed to search was smaller (a few hundred, rather than many thousands) than I'd originally thought.

But, I'm sure I'll run into a more complicated case in the future and will go look at those many google references when the time comes...

-Henry