Subject: Amoeba and Tied Parameters
Posted by Maryam on Sat, 14 Jan 2017 04:06:35 GMT
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Does anyone know how I can tie two parameters together when using Amoeba so that no matter how much they are changed, they are always equal? In other words, I am looking for something similar to .TIED in MPFIT but when using AMOEBA instead.

Thank you,
Maryam

Subject: Re: Amoeba and Tied Parameters
Posted by Dick Jackson on Sat, 14 Jan 2017 15:43:48 GMT
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On Friday, 13 January 2017 20:06:36 UTC-8, Maryam wrote:

> Does anyone know how I can tie two parameters together when using Amoeba so that no matter how much they are changed, they are always equal? In other words, I am looking for something similar to .TIED in MPFIT but when using AMOEBA instead.
>
> Thank you,
> Maryam

Hi Maryam,

If you are minimizing a function of 'n' parameters, and you want to tie one of them to be identical to another one (or computed as a function of another one), then you really only have 'n-1' parameters, making your minimization problem one dimension smaller.

For example, if your function to be minimized were originally computed based on p[0], p[1] and p[2], then you decide to tie p[2] to be equal to p[0], simply replace each p[2] in the function by p[0], and adjust your use of P0, SCALE, SIMPLEX, and the result of FUNCTION_VALUE to work with an 'n' of two rather than three.

Similarly, for example, if you knew that you want to tie p[2] to always be the square root of p[0], in your function you could compute it based on p[0], p[1] and a variable you compute as p2 = Sqrt(p[0]).

I hope this helps you out!

Cheers,
-Dick

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Subject: Re: Amoeba and Tied Parameters
Posted by Maryam on Sat, 14 Jan 2017 18:27:46 GMT
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Hello Dick,

Thanks for your reply.

My function is actually not that simple. It takes my parameters as input and runs a code in R. It then takes the result of the simulation from the R code and compares it with the model by calculating the chi-squared value. Then it replaces my parameters with the new ones and calls the R code again. However, I need to make sure that some parameters are changed by the same amount by Amoeba and I don't believe I can simply do p[0]=p[2].

Subject: Re: Amoeba and Tied Parameters
Posted by Maryam on Wed, 18 Jan 2017 02:21:21 GMT
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Hello All,

Just thought to post an update regarding making a parameter tied to another parameter when using the Amoeba fitting routine in case anyone encountered the same issue later. Thanks to Dick Jackson, we were able to fix this problem. Here is how we did it:

I have a very large parameter space (22 parameters), 4 of which are fixed (so I set scale to zero for those four). I also have 3 pairs of parameters that are free to change by Amoeba but they must change by the same amount (i.e. p[13] must always be equal to p[10], and p[17] must always be p[14], etc.) The problem is my function does not have a simple form. It calls an R code to run some simulation, takes the result of that simulation, makes a plot, compares it to some model and calculates the chi-squared value. So I could not simply just set those parameters equal to each other and pass all the parameters to Amoeba.

What Dick suggested was to start by reducing my parameter space as much as we could by creating a subset of parameters for the call to Amoeba() and the FUNC() routine, and expanding to the full set before the code takes in the 22 parameters that it needs to run the simulations. This way we would be passing fewer parameters to the fitting routine by defining a new COMMON block that takes that subset of parameters and passes them to the fitting routine as opposed to Amoeba treating the tied parameters differently and then setting them equal before the call to the simulation code.

I am very grateful for Dick's help; so thank you very much Dick.