Subject: Re: mpfit: what's different
Posted by Craig Markwardt on Mon, 11 Feb 2008 13:39:28 GMT
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Wox <nomail@hotmail.com> writes:

> Hi everyone,
>
> Is there any documentation on the theory behind Craig Markwardt's
> mpfit? What's different from the Levenberg-Marquardt algorithm as
> given in "Numerical Recipes in C" (used in IDL's curvefit)?
>

Hi, I'm back!

First off, I should say that MPFIT is based on MINPACK (by Jose More' et al), so I don't take any of the credit for the underlying algorithm.

Basically, Numerical Recipes is a quick and dirty implementation of Levenberg Marquardt, so what you get are quick and dirty results. Some of it boils down to how the normal equations are determined (MPFIT doesn't; it uses direct QR factorization of the Jacobian, which improves numerical precision); how the LM parameter and trust region are determined (Numerical Recipes doesn't really have a concept of "trust region"); and the convergence criteria.

Also, as David points out, MPFIT has more features than CURVEFIT, such as the abillity to fix or vary certain parameters, the ability to set simple parameter boundaries, to tie parameters together, and some advanced options for keeping track of the fit status. The MPFIT* library also has a few different flavors of the main routine, to make things easy in certain cases (1d fitting, 2d fitting, using an expression insted of a function, and so on).

> Is it a difference in choosing the damping factor in the modified
> curvature matrix or is there more to it?

I'm not sure what this means. I encourage you to consult the primary references in the mpfit.pro documentation section.

Good luck, and happy fitting,
Craig Markwardt