Subject: Re: Solving nonlinear equations
Posted by Craig Markwardt on Sat, 01 Nov 2003 23:03:47 GMT
View Forum Message <> Reply to Message

Thierry Savin <savin@mit.edu> writes:
> Hi all,
>
> Is it possible to create a function called let's say "solvef":
>
> IDL> x=solvef(a,'f')
>
> that returns x the solution of f(x,a)=0 ?

Either MPFIT or TNMIN from my web page can do this kind of job. Both are designed to be function minimizers. MPFIT will minimize the square of any function [in fact the sum of squares of N functions]. Although people don't normally think of it as so, MPFIT is actually an equation solver, in addition to a least squares solver.

Your set of fixed parameters, A, would normally passed using FUNCTARGS. Your notation of X (the varying parameter) and A (the fixed parameters) are actually reversed from the notation used in MPFIT or MPFITFUN, where P is the varying parameter and X are the fixed parameters. Example:

```
function fx, a, x
  return, a(0)+a(1)*x+a(2)*x^2
end


print, mpfitfun('fx', [-2d,10d,4d], [0,0,0], 10, [0d], /quiet)
    0.18614066
```

[Not sure why an uncertainty estimate of 10 is needed though, hmmm.]
Or, one can define a new function which is the square of the desired function, and use TNMIN:

```
function fffsq, x, a=a
  return, ( a(0)+a(1)*x+a(2)*x^2)^2
end

print, tnmin('fffsq', [0d], functargs={a:[-2d,10d,4d]},/autoderiv, /quiet)
    0.18614066
```

Both of these numbers are close to the exact value.

Craig

--
 --- -------------
Craig B. Markwardt, Ph.D. EMAIL: craigmnet@REMOVEcow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
 --- -------------

Subject: Re: Solving nonlinear equations
Posted by mmeron on Sun, 02 Nov 2003 00:48:59 GMT
View Forum Message <> Reply to Message

In article <3FA431FE.9050807@mit.edu>, Thierry Savin <savin@mit.edu> writes:
> Hi all,
>
> Is it possible to create a function called let's say "solvef":
>
> IDL> x=solvef(a,'f')
>
> that returns x the solution of f(x,a)=0 ?
>
Yes.

> Thanks for any suggestion.
>
Check out the function ROOT in my library (library is called MIDL,
you'll find it on the RSI users contributions page). For cases where
the function is just given as a set ov values (no analytical
representation) you may consider SPLINROOT, in the same library.

Mati Meron | "When you argue with a fool,
meron@cars.uchicago.edu | chances are he is doing just the same"

Subject: Re: Solving nonlinear equations
Posted by the_cacc on Sun, 02 Nov 2003 06:01:15 GMT
View Forum Message <> Reply to Message

</shameless plug for own code>

Gents, please. We all know you're really clever.

<On Topic>

The IDL function amoeba is pretty handy.

</On Topic>

Subject: Re: Solving nonlinear equations
Posted by David Fanning on Sun, 02 Nov 2003 18:19:00 GMT
View Forum Message <> Reply to Message

trouble writes:

> </shameless plug for own code>
>
> Gents, please. We all know you're really clever.

Alright, I'll rise to this bait. Here are five
reasons I prefer to have the experts on this
newsgroup blow their own horns:

1. The programs they tout are (nearly always)
   better than comparable routines that come
   with IDL. This is especially so with Craig's
   mathematical routines, IMHO.

2. Their programs almost always address shortcomings
   or weaknesses in IDL routines. For example, Liam's
   IMGDISP is a much better image display routine
   than TV, for all kinds of reasons (you don't have
   to know the decomposed setting of your device,
   it works identically on your display and in PostScript,
   it works with !P.MULTI, etc., etc.).

3. The advice is (almost always) motivated by
   experience, not hype. I've never seen an
   acknowledged IDL expert advocate the GUI Builder
   here, for example. Even when the advice *is*
   motivated by self-aggrandizement (I've noticed
   some of this in my own posts, particularly), the
   advice is always free and it is easy to tell when
   it is worth as much as it costs.

4. The experts don't *have* to hang out here.
   Lord knows they are not getting rich answering
   all the questions they answer. Putting up with
   the occasional shameless plug is a small price
   to pay for having them here and available
   to us. I wish they got *more* acknowledgement
   for their significant contributions, not less.
   (And I want to mention especially how much I
   appreciate Karl Shultz's contributions to this

newsgroup. I wish we had more of this from RSI.)

5. Sometimes you have to say the same thing over and over again before people hear it. I offer the 10 million Google references to the phrase "Device, Decomposed=0" as evidence.

And I offer one bonus reason. The IDL newsgroup experts really *are* clever. New and experienced users alike can learn more about IDL by following the links to their (possibly over-hyped) programs then they will ever learn by reading the iTools User Guide.

Cheers,

David

--
David W. Fanning, Ph.D.
Fanning Software Consulting, Inc.
Phone: 970-221-0438, E-mail: david@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Toll-Free IDL Book Orders: 1-888-461-0155
