Subject: Re: Better Root Finder

Posted by jschwab@gmail.com on Sun, 15 Apr 2007 20:41:23 GMT

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On Apr 15, 12:55 am, "Max Watson" <max...@gmail.com> wrote:

- > IDL's fx\_root seems very limited; when I want to find the root of say
- > x^3 8 with the initial guess vector [-1,-100,100], IDL returns a
- > complex number: ( -1.00000, 1.73205). Is there a way that
- > fx\_root can be easily modified so that it can find the right answer
- > with a bad initial guess?

I wouldn't say that fx\_root is limited from that example; it is finding (one of) the correct (complex) solutions.

If you are only solving polynomial equations and need to get all the real solutions, you could try fz\_roots, which gives you all of the solutions to a given polynomial. Then pick off the real solutions, or whatever your desired "right answer" is.

I wouldn't say that's necessarily the best solution, but it's certainly one of the easiest.

Subject: Re: Better Root Finder

Posted by wlandsman@jhu.edu on Mon, 16 Apr 2007 00:01:03 GMT

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<jschwab@gmail.com> wrote in message

news:1176669683.157908.311410@b75g2000hsg.googlegroups.com...

- > On Apr 15, 12:55 am, "Max Watson" <max...@gmail.com> wrote:
- >> IDL's fx\_root seems very limited; when I want to find the root of say
- >> x^3 8 with the initial guess vector [-1,-100,100], IDL returns a
- >> complex number: ( -1.00000, 1.73205). Is there a way that
- >> fx root can be easily modified so that it can find the right answer
- >> with a bad initial guess?

I think that the previous suggestion of using FZ\_ROOTS if you have a polynomial, or is the way to go, but in the off-chance that you are only interested in cubic polynomial equations, as in your example, \*and\* you are only interested in the (one or three) real roots, then this can be solved analytically, e.g.

http://idlastro.gsfc.nasa.gov/ftp/contrib/freudenreich/cuber oot.pro

IDL> print, (cuberoot([-8,0,0,1]))(0) 2.0000000

If you don't have any type of polynomial, but you know that a real root

exists, then you can also find the zero using zbrent.pro in http://idlastro.gsfc.nasa.gov/ftp/pro/math/zbrent.pro to find the root numerically to within a specified tolerance.

--Wayne

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Subject: Re: Better Root Finder
Posted by mmeron on Mon, 16 Apr 2007 19:17:28 GMT
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In article <31zUh.663\$0S1.610@trnddc01>, "Wayne Landsman" <wlandsman@jhu.edu> writes: > <jschwab@gmail.com> wrote in message > news:1176669683.157908.311410@b75g2000hsg.googlegroups.com... >> On Apr 15, 12:55 am, "Max Watson" <max...@gmail.com> wrote: >>> IDL's fx\_root seems very limited; when I want to find the root of say >>> x^3 - 8 with the initial guess vector [-1,-100,100], IDL returns a >>> complex number: ( -1.00000, 1.73205). Is there a way that >>> fx root can be easily modified so that it can find the right answer >>> with a bad initial guess? > I think that the previous suggestion of using FZ ROOTS if you have a > polynomial, or is the way to go, but in the off-chance that you are only > interested in cubic polynomial equations, as in your example, \*and\* you are > only interested in the (one or three) real roots, then this can be solved > analytically, e.g. > > http://idlastro.gsfc.nasa.gov/ftp/contrib/freudenreich/cuber oot.pro > IDL> print, (cuberoot([-8,0,0,1]))(0) 2.0000000 > If you don't have any type of polynomial, but you know that a real root > exists, then you can also find the zero using zbrent.pro in > http://idlastro.gsfc.nasa.gov/ftp/pro/math/zbrent.pro to find the root > numerically to within a specified tolerance. Or, if you think you may have more than one real root, you can use my ROOT routine and try to get them all. Mati Meron | "When you argue with a fool, meron@cars.uchicago.edu chances are he is doing just the same"