Re: Finding roots of non−linear equations in Excel

Source:
http://www.tech−archive.net/Archive/Excel/microsoft.public.excel.worksheet.functions/2004−08/0798.html

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From: TCO (*TCO_at_discussions.microsoft.com*)
Date: 08/04/04

Date: Wed, 4 Aug 2004 10:25:01 −0700

"hgrove >" wrote:

> *TCO wrote...*
> *...*
> *>I should re−write the function slightly as follows:*
> *>*
> *>tan(0.155x)−(0.42x)/(x^2−0.0438)=0*
> *You have an interesting interpretation of 'slightly'.*
> *>I am trying to determine positive values of x where the left hand*
> *>side is zero. The number 0 satisfies the equation, but there are*
> *>other roots at 1.64, 10.4, 20.4, 30.5, etc. . . . I am looking for a*
> *>way of seamlessly integrating a root finding Macro into an Excel*
> *>spreadsheet that would find the roots to the above equation.*
> *>The constants (0.155, 0.42, and 0.0438) will be the only user−*
> *>defined values that change from run−to−run.*
> *>*
> *>I have found root solvers on the net. Most all are stand−alone*
> *>apps, probably written in VBA. . . .*
> *Why do you believe they're probably written in VBA? In my experience,*
> *most people with the education and experience to know how to do*
> *numerical programming don't use any dialect of BASIC if they can avoid*
> *doing so. Where's the 'Numeric Recipes in BASIC' book?*
> *> . . . I need the code that could be transferred into my own*
> *>Macro (I assume this would be better than a "Function" because*
> *>the Macro can run in the background within a spreadsheet?) . . .*
> *Nope. Any & all VBA code runs in foreground.*
> *> . . . which becomes part of my stand−alone worksheet.*
> *...*
> *For any continuous function, you need to find an x interval in which*

> *the function of interest evaluates positive at one of its bounds and*
> *negative at its other bound. Once such an interval has been located,*
> *it's no big deal to find the zero. Binary search, Newton's method and*
> *secant method could all be used (binary search is slowest but also*
> *surest − Newton and secant methods could go off on tangents). The*
> *tricky part is thus identifying the intervals, and it's nearly*
> *impossible in general to guarantee that any interval that contains a*
> *zero contains only one zero.*
>
> *But if you're interested, see chapter 9 of either*
>
> *http://lib−www.lanl.gov/numerical/bookcpdf.html*
>
> *or*
>
> *http://lib−www.lanl.gov/numerical/bookfpdf.html*
>
> *depending on whether you prefer C or FORTRAN.*
>
>
> *−−−*
> *Message posted from http://www.ExcelForum.com/*
>
>

I can re−write:

tan(0.155x)−(0.42x)/(x^2−0.0438)=0

as:

x=ATAN((0.42*x)/(x^2−0.0438))/0.155

which other than the values of the constants and variable designations (i.e., A1 vs. x) should have the same functional form as what I originally wrote. Sorry about the confusion.

Also, you are correct, the Numerical Recipes book is Fortran and C. I mentioned Basic only because my goal is to utilize Excel for an a−typical spreadsheet computation. Thanks for the LANL link to the current Fortran copy.

Tim