Office

Applies To: Office | Office 2010 | Microsoft Office Excel

Question

1 Had this question Me Too

JT2012XXX asked on May 14, 2012

How can I add in a hyperbolic regression curve in Excel 2010?

Original Title: "hyperbolic curve"
In addition to Linear, Polynomial selections in Excel - we would like the option to add-in a Hyperbolic regression curve.

Is there a Template that exists with this option? or other instructions welcome!

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Answer

0 Found this helpful Me Too

E.J. GUN replied on May 14, 2012

Community Star

A hyperbolic curve of the form y=(m*x)/(k+x) has a discontinuity at x = -k. This prevents a "traditional" curve fitting of the entire curve, but you can easily fit the curve if you transform the equation into a linear version, solve for the linearized coefficients, and then use those coefficients to fit the non-linear data. Steps to take:

1. Instead of fitting y=(m*x)/(k+x), you will transform the equation into (1/y) = (1/m) + (k/m)*(1/x).
2. Now you have two new coefficients, A = (1/m) and B = (k/m), and two new variables (1/y) and (1/x)
3. The new equation becomes (1/y) = A + B*(1/x). You can run a linear regression on this equation, using the(x,y) set of data you are trying to fit, to solve for the coefficients A and B.
4. Once you have A and B, you can solve for m and k:
   m = 1/A
   k = m*B
5. Use the coefficients m and k to calculate the fitted curve.

You have to watch for and handle discontinuities (x = 0, y = 0, x = k, etc).

HTH,
Eric

P.S. - this can all be done with equations on a worksheet, or with VBA

If this post is helpful or answers the question, please mark it so.

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Answer

0 Found this helpful Me Too

Gary's Student replied on May 14, 2012

MVP Community Star

While not a template, here is an example of GUN's solution. Say the x values are in colum A (A1 thru A10) and the y values are in column B (B1 thru B10):

1 0.500000
2 0.933333
3 1.312500
4 1.647059
5 1.944444

Related Content

There is no related content.

In C1 enter:
=1/A1 and copy down
In D1 enter:
=1/B1 and copy down
Cols C & D display:
1.000000 2.000000
0.500000 1.071429
0.333333 0.761905
0.250000 0.607143
0.200000 0.514286
0.166667 0.452381
0.142857 0.408163
0.125000 0.375000
0.111111 0.349206
0.100000 0.328571

To do a linear fit to cols C & D, in E1 enter:
=SLOPE(D1:D10,C1:C10)
In E2 enter:
=INTERCEPT(D1:D10,C1:C10)
This displays:
1.857143
0.142857

Finally to calculate m and k, in F1 enter:
=1/E2
and in F2 enter:
=F1*E1
F1 and F2 display
7
13

The fit is then

y=(7*x)/(13+x)

GSNU201305

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All Replies (2)

Answer

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Me Too

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Me Too

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1 0.500000
2 0.933333
3 1.312500
4 1.647059
5 1.944444
6 2.210526
7 2.450000
8 2.666667
9 2.863636
10 3.043478

In C1 enter:
=1/A1 and copy down
In D1 enter:
=1/B1 and copy down
Cols C & D display:
1.000000 2.000000
0.500000 1.071429
0.333333 0.761905
0.250000 0.607143
0.200000 0.514286
0.166667 0.452381
0.142857 0.408163
0.125000 0.375000
0.111111 0.349206
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