
Subject: Re: Fitting Circles

Posted by [Vince Hradil](#) on Wed, 01 Dec 1999 08:00:00 GMT

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How about doing a transformation and solving a simpler problem:

What you want to fit is $r0 = [(x-x0)^2 + (y-y0)^2]^{(0.5)}$

So minimize:

$$r0 - [(x-x0)^2 + (y-y0)^2]^{(0.5)}$$

for all pairs of (x,y). This can be done using your favorite fitting routine (I like Craig markwardt's MPFIT... routines, <http://cow.physics.wisc.edu/~craigm/idl/idl.html>)

Good luck

F.N.Hatfield@Leeds.ac.uk wrote:

>
> Dear Colleagues,
>
> I am trying to fit a circle to a set of points (x,y), and from this
> determine the centre point (x0,y0) and radius r0. It is also very
> important that I obtain the standard deviations or errors in the x0,y0
> and r0.
>
> So far, I have looked at the idl routine, curvefit.pro.
> This is a useful program but doesn't seem to allow you to pass 2
> independent variables x and y.
> I was wondering if someone has written something similar in idl,
> or could suggest a way to solve this problem.
>
> Cheers
>
> Fraser Hatfield
>
> University of Leeds, UK.
>
> Sent via Deja.com <http://www.deja.com/>
> Before you buy.

Subject: Re: Fitting Circles

Posted by [Struan Gray](#) on Wed, 01 Dec 1999 08:00:00 GMT

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F.N.Hatfield@Leeds.ac.uk writes:

> I am trying to fit a circle to a set of points (x,y), and

- > from this determine the centre point (x_0, y_0) and radius r_0 .
- > It is also very important that I obtain the standard
- > deviations or errors in the x_0, y_0 and r_0 .

I can see two approaches, depending on what you mean by *the* s.d..

First, Craig Markwardt's MPFIT and associated routines are much more useful than curvefit:

<http://cow.physics.wisc.edu/~craigm/idl/>

This will let you find the circle with the minimum least squares error w.r.t. your set of points. You can then define a suitable region of r_0, x_0, y_0 space and simply calculate the least squares error for an appropriately dense set of points. IDL's built in MOMENT routine can then be used to extract the s.d. for each variable.

Alternately, there is a simple algebraic expression for the unique circle passing through any three points. If you calculate it for all permutations (warning: the number of permutations will explode if you have lots of points) you can generate arrays of r_0 , x_0 , and y_0 values. Again, MOMENT can then be used to extract statistics (or you can roll your own mean and s.d. calculation).

Struan
