
Subject: Re: One ellipse to rule them all

Posted by [David Fanning](#) on Mon, 11 Feb 2008 22:51:16 GMT

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ianpaul.freeley@gmail.com writes:

> I'm hoping someone has done this before and can help me out.
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> I have a bunch of x,y points, and I'd like to find the ellipse (with
> minimum area) that encompasses all of them. Any thoughts?

I can show you how to find an ellipse:

http://www.dfanning.com/ip_tips/fit_ellipse.html

To enclose all the points I would, uh, expand it slowly. :-)

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming (www.dfanning.com)

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: One ellipse to rule them all

Posted by [ianpaul.freeley](#) on Mon, 11 Feb 2008 23:06:54 GMT

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On Feb 11, 4:51 pm, David Fanning <n...@dfanning.com> wrote:

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My gut tells me I should be able to do it analytically. I *think* the two points that have the largest separation should define the major axis and position angle. Then I just need to fit for the minor axis from the rest of the points, and the largest one is the winner.

Subject: Re: One ellipse to rule them all
Posted by [pgrigis](#) on Mon, 11 Feb 2008 23:55:14 GMT
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I don't think that is true in general.

Take three points building an equilateral triangle. The minimum area ellipse including them is the circle centered on the geometric center of the triangle, not any ellipse whose major axis connects two points on the triangle.

Cheers,

Paolo

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Subject: Re: One ellipse to rule them all

Posted by [Vince Hradil](#) on Mon, 11 Feb 2008 23:55:41 GMT

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On Feb 11, 5:06 pm, ianpaul.free...@gmail.com wrote:

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Look here - and references therein:

http://www-eleves-isia.cma.fr/documentation/CgalDoc2.4/basic_lib/Optimisation_ref/Class_Min_ellipse_2.html

Subject: Re: One ellipse to rule them all

Posted by [Brian Larsen](#) on Tue, 12 Feb 2008 16:08:59 GMT

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I agree with the thoughts of this posting. A little work with a pen
can go a long way.

Personally I would

- start with the ellipse you define, and maybe enlarge it some to be sure.
- define a cost function for ameoba that adjusts the tilt angle, semi-minor and semi-major axis where the cost is the area of the ellipse and you can be sure it has all the points but the cost for not being huge.
- run it and see what you get

Of course standing on the shoulders of giants is better, so if any of the mentioned references are good (I didnt read them) then go that route.

Cheers,

Brian

Brian Larsen
Boston University
Center for Space Physics
