

Re: algorithm to determine smallest circumscribed circle of an arbitrary convex polygon

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- *From:* Marc <mbletry@xxxxxxxxxx>
 - *Date:* Tue, 26 Feb 2008 12:30:03 -0800 (PST)
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On 26 fév, 21:28, Marc <mble...@xxxxxxxxxx> wrote:

On 26 fév, 21:03, Helmut Richter <hh...@xxxxxxx> wrote:

On Tue, 26 Feb 2008, Marc wrote:

I am looking for an algorithm that would provide the smallest circumscribed circle around an arbitrary convex polygon ? If anyone has a clue, I'd be very interested !

It is easy to show that the solution is either

– the circumscribed circle of an acute-angled triangle from the original vertices or

– the circle whose diameter consists of the line connecting two of the original vertices

This gives rise to an algorithm to compute the smallest circumscribed circle around 4 points. You can extend that algorithm to any number of points:

Start with any subset of four points with their circumscribed circle (it is smart to start with distant points but it is no use to spend time on

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this step). Find a subset S of two or three of them that already define the same circumscribed circle. If none of the original vertices is outside that circle, you are done. If there is at least one vertex P outside the circle, start over beginning with the set $S \cup \{P\}$. Each circle is larger than the previous one, so the algorithm terminates.

Do not try to prove that vertices that were captured by one circle are contained in all subsequent circles: it is not true.