Re: Convex Hull of Points on a Straight Line

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- *From*: "Babua" <pinaki@xxxxxxxxxxxxx>
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If we take two points (x1,y1) and (x2,y2) then by a convex
combination of these two points we mean any point of the
following form:

[kx1+(1−k)x2, ky1+(1−k)y2] for 0<=k<=1

In this context I would just like to add a point that in
the lower bound proof where sorting is reduced to convex
hull problem to avoid the problem of colineraity the data
x for sorting is mapped to the point (x,x^2) on a parabola
and not to (x,x) on a line for the 2D convex hull problem.

Thanks.

−−−− Pinaki

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eKo1 wrote:

> What do you mean by "convex combination?" Would you provide an example?
>
> Babua wrote:
>
>> This is a degenerate 2D problem. If you consider it as a 1D problem
>> then any convex hull will be a line segment. Any convex combination
>> of any two points within that segment also belongs to that segment.
>> So the 1D problem can be solved in O(n) time unlike the 2D problem
>> that is lower bounded by \omega(nlogn).
>>
>> Thanks.
>>
>> −−− Pinaki
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>> ===
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>> eKo1 wrote:

Let L be a straight line on the cartesian plane. Pick a finite set of
points S on that line. What is the convex hull of S?

> From my understanding of hull points, the convex hull is the two points

farthest away from each other in S. Is this true?

I ask because there is a version of Graham's algorithm in my discrete
mathematics book that does not consider the case when there are two
points whose segments with the first hull point have the same angle
with respect to the horizontal. I guess this version of the algorithm
is flawed in that respect.

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