

## Re: convex hull

**Source:** <http://sci.tech-archive.net/Archive/sci.math/2005-02/3130.html>

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**Date:** 02/09/05

Date: Wed, 09 Feb 2005 19:24:33 +0000

dumb\_founded wrote:

- > *If we describe formally the convex hull of a set S as the set that, for*
- > *all  $y_1, y_2$  member S,  $(\alpha)y_1 + (1-\alpha)y_2$  is a member of the convex*
- > *hull, then will the convex hull, defined in this manner, of S be convex*
- > *necessarily? If not, why not?*

You are considering all convex combinations of TWO elements of S.  
What if S is the three-element set consisting of the vertices of a triangle?  
The two-element convex combinations of S form the perimeter of this triangle, but the convex hull contains the interior of the triangle too.

A theorem of Caratheodory asserts that if S is a subset of  $\mathbb{R}^n$  then the convex hull of S is the set of  $(n+1)$ -element convex combinations of elements of S.

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Robin Chapman, [www.maths.ex.ac.uk/~rjc/rjc.html](http://www.maths.ex.ac.uk/~rjc/rjc.html)

"Elegance is an algorithm"

Iain M. Banks, [\\_The Algebraist\\_](#)