

Grünbaum, Branko**How to convexify a polygon.** (English) Zbl 0866.52001
Geombinatorics 5, No. 1, 24-30 (1995).

The paper reports on the strange history of an approach to convexify a polygon by so-called flips, i.e., reflecting interior parts of the polygon at supporting lines. This was initially proposed by *P. Erdős* [Am. Math. Mon. 42, 396 (1935) (Problem 3763)] for polygons and taken up by *S. A. Robertson* [Geometry and topology III, 264-275 (1991; Zbl 0727.53004)] for simply closed curves under the notion of inflation. Both proposals contain as a small deficiency that they consider all flips which can be made for a given curve simultaneously, which easily can be seen to run into dead locks immediately or for the iterated procedures possibly. Hence later approaches which sometimes occurred independently, relied on one flip only and applied the iterated procedures to the transformed curve then.

The author presents a procedure for the choice of flips which leads to a convex limit after a finite number of steps (which essentially goes back to *B. Sz.-Nagy* [Am. Math. Mon. 46, 176-177 (1939)]) and reproduces two results obtained by *R. R. Joss* and *W. Shannon* 20 years ago, which had not been published due to some unfortunate circumstances. The first one shows that for every integer n there exists a quadrangle which cannot be convexified by less than n flips. The second one proves that replacing flips by flipturns $(n-1)!$ is a uniform bound for n -gons such that they will be convexified after less than $(n-1)!$ flipturns.

Several results have been obtained in this direction by different authors, and they are described also in this article. These are complemented by the article from *B. Wegner* in Beitr. Algebra Geom. 34, No. 1, 77-85 (1993; Zbl 0772.52004) in the case of polygons and by the article of *S. A. Robertson* and *B. Wegner* in the volume Coll. Math. Soc. Janos Bolyai 63, Intuitive Geometry, 1991, 389-401 (1994; Zbl 0829.53003) in the case of C^1 -curves.

Reviewer: [Bernd Wegner \(Berlin\)](#)**MSC:**

[52A10](#) Convex sets in 2 dimensions (including convex curves)
[53A04](#) Curves in Euclidean and related spaces

Cited in **2** Reviews
Cited in **3** Documents**Keywords:**[convexify a polygon](#)