Braun, Benjamin; **Ehrenborg, Richard**
The complex of non-crossing diagonals of a polygon. (English) ┃ Zbl 1196.52008 ┃
J. Comb. Theory, Ser. A 117, No. 6, 642-649 (2010).

Summary: Given a convex n-gon P in $\mathbb{R}^2$ with vertices in general position, it is well known that the simplicial complex $\theta(P)$ with vertex set given by diagonals in P and facets given by triangulations of P is the boundary complex of a polytope of dimension $n-3$. We prove that for any non-convex polygonal region P with n vertices and $h+1$ boundary components, $\theta(P)$ is a ball of dimension $n+3h-4$. We also provide a new proof that $\theta(P)$ is a sphere when P is convex with vertices in general position.

MSC:

52B05   Combinatorial properties of polytopes and polyhedra (number of faces, shortest paths, etc.)

Keywords:

non-convex polygon; associahedra; simplicial complex; discrete Morse theory

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