On the use of cone-convexity in set estimation

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While the assumption of convexity is in general too restrictive for most practical uses in set and manifold estimation, there are other more general notions which retain some of the important properties of the convexity concept. One example is the so-called r-convexity [see e.g. Cuevas, Pateiro-López and Fraiman (2012, Adv. Appl. Prob.)]. However, we will rather focus here in another, still more general, notion called *cone-convexity*.

Roughly speaking, a closed set S is said to be cone-convex when for each point x in the boundary of S, there is a finite cone (with a given height and opening angle) which vertex at x, whose interior is completely included in the complement of S. It turns out that a cone-convex set can be estimated, from a random sample of points drawn on S, by the "cone-convex hull" of the sample points (a direct extension of the classical convex hull). Taking as a basic reference the recent paper by Cholaquidis, Cuevas and Fraiman (2014, Ann. Statist.), we will

(a) briefly discuss the notion of cone-convexity,

(b) present some relevant results on cone-convex sets and their estimation,

(c) outline some open results and new insights, both in the theoretical and the computational aspect, and

(d) discuss some possible applications in the problem of home range estimation in zoology and ecology.

An important part of this talk is a summary of joint work with Alejandro Cholaquidis and Ricardo Fraiman (Universidad de la República, Uruguay).

Keywords: cone-convexity, set estimation, boundary estimation, home range.