



Recovering the shape of a point cloud in the plane

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In this work we deal with the problem of support estimation under shape restrictions. The shape restriction we deal with is an extension of the notion of convexity named α -convexity. Instead of assuming, as in the convex case, the existence of a separating hyperplane for each exterior point we assume the existence of a separating open ball with radius α . Given an α -convex set S , the α -convex hull of independent random points in S is the natural estimator of the set. If α is unknown the r_n -convex hull of the sample can be considered. We analyze the asymptotic properties of the r_n -convex hull estimator in the bidimensional case and obtain the convergence rate for the expected distance in measure between the set and the estimator. The geometrical complexity of the estimator and its dependence on r_n is also obtained via the analysis of the expected number of vertices of the r_n -convex hull.

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