Estimation of a convex support function using regression splines

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Abstract: Estimation of a convex set given noisy measurements of the support function is accomplished using regression splines with shape constraints. The problem in formulated in terms of a projection onto a convex cone and rates of convergence are obtained. A test statistic is derived for the null hypothesis that the convex set is a circle, and it is shown that its distribution under the null is that of a mixture of beta random variables.