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RANDOM CONVEX HULLS: APPLICATIONS TO ECOLOGY AND ANIMAL EPIDEMICS

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Abstract:

Convex hull of a set of points in two dimensions roughly describes the shape of the set. In this talk, I will discuss the statistical properties of the convex hull for two stochastic processes in two dimensions: (i) a set of n independent planar Brownian paths (ii) a branching Brownian motion with death. We show how to compute exactly the mean perimeter and the mean area of the convex hull in these two problems. The first problem has application in estimating the home range of an animal population of size n , while the second will be used to estimate the spatial extent of the outbreak of animal epidemics. Our result also makes an interesting connection between random geometry and extreme value statistics.