Convex Hull of N Planar Brownian Motions: Exact Results and an Application to Ecology

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Convex hull of a set of points in two dimension roughly describes the shape of the set. In this talk, I will discuss the statistical properties of the convex hull of a set of N independent planar Brownian paths. We compute exactly the mean perimeter and the mean area of this convex hull, both for open and closed paths. Surprisingly, the area and perimeter grows extremely slowly (logarithmically) with increasing population size N. This slow growth is a consequence of extreme value statistics and has interesting implication in ecological context in estimating the home range of a herd of animals with population size N.

References

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[2] S. N. Majumdar, A. Comtet, and J. Randon-Furling, J. Stat. Phys. **138** 955 (2010).