Distributing many points on a sphere

Abstract

The problem of distributing a large number of points uniformly over the surface of a sphere arises in many practical and theoretical situations. We discuss generating such points by optimization with respect to a generalized energy criterion. Our interest is primarily with the asymptotic behavior of these optimal spherical configurations of N points as N tends to infinity. Methods for generating "near optimal" points will also be discussed along with several challenging open problems.

References

1. E.B. Saff and A.B.J. Kuijlaars, "Distributing Many Points on a Sphere", Math. Intelligencer, vol. 19 (1997), 5-11.

2. A.B.J. Kuijlaars and E.B. Saff, "Asymptotics for Minimal Discrete Energy on the Sphere", Trans. Amer. Math. Soc., vol. 350 (1998), 523-538.

3. E.A. Rakhmanov, E.B. Saff, and Y.M. Zhou, "Electrons on the Sphere", in Computational Methods and Function Theory (R.M. Ali, St. Ruscheweyh, and E.B. Saff, eds.) World Scientific (1995), 111-127.

4. E.A. Rakhmanov, E.B. Saff, and Y.M. Zhou, "Minimal Discrete Energy on the Sphere", Math. Research Letters, vol. 1 (1994), 647-662.