



北京理工大学

数学与统计学院学术报告

Gravitational allocation to uniform points on the sphere

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摘要: Given n uniform points on the surface of a two-dimensional sphere, how can we partition the sphere fairly among them? "Fairly" means that each region has the same area. It turns out that if the given points apply a two-dimensional gravity force to the rest of the sphere, then the basins of attraction for the resulting gradient flow yield such a partition—with exactly equal areas, no matter how the points are distributed. (See the cover of the AMS Notices

at <http://www.ams.org/publications/journals/notices/201705/rnoti-cvr1.pdf> or the PNAS article <http://www.pnas.org/content/early/2018/09/06/1720804115>). Our main result is that this partition minimizes, up to a bounded factor, the average distance between points in the same cell. I will also present an application to almost optimal matching of n uniform blue points to n uniform red points on the sphere, connecting to a classical result of Ajtai, Komlos and Tusnady (Combinatorica 1984). I will emphasize open problems on the diameters of the basins and the behavior of greedy matching schemes. Joint work with Nina Holden and Alex Zhai.

个人简介: Yuval Peres obtained his PhD in 1990 from the Hebrew University, Jerusalem. He was a postdoc at Stanford and Yale, and was then a Professor of Mathematics and Statistics in Jerusalem and in Berkeley. Later, he was a Principal researcher at Microsoft. Yuval has published more than 350 papers in most areas of probability theory, including random walks, Brownian motion, percolation, and random graphs. He has co-authored books on Markov chains, probability on graphs, game theory and Brownian motion. Dr. Peres is a recipient of the Rollo Davidson prize and the Loeve prize. He has mentored 21 PhD students including Elchanan Mossel (MIT, AMS fellow), Jian Ding (PKU, Loeve prize), Balint Virag and Gabor Pete (Rollo Davidson prize). Dr. Peres was an invited speaker at the 2002 International Congress of Mathematicians in Beijing, at the 2008 European congress of Math, and at the 2017 Math Congress of the Americas. In 2016, he was elected to the US National Academy of Science.