Seminar on Combinatorial Computing
November 3, Wednesday, 6:30 p.m.
Room 6417, Graduate Center
365 Fifth Avenue, New York

Iterative Processes in the Plane

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Abstract

Given S_1, a starting set of points in the plane, not all on a line, we define a sequence of planar point sets $\{S_i\}_{i=1}^{\infty}$ as follows. With S_i already determined, let L_i be the set of all the lines determined by pairs of points from S_i, and let S_{i+1} be the set of all the intersection points of lines in L_i. We will show that with the exception of some very particular starting configurations, the limiting point set $\bigcup_{i=1}^{\infty} S_i$ is everywhere dense in the plane.

A related result of Bezdek and Pach (with lines "replaced" by unit circles) will also be discussed. Finally, we will attempt to define other iterative procedures on planar point sets and state several open problems. For example, it is conjectured that every set P of noncollinear points in the plane, such that the center of the circumscribed circle of every triangle spanned by three points of P belongs to P, is everywhere dense in the plane.

This is a joint work with Dan Ismailescu.

For further information contact Janos Pach at pach@cims.nyu.edu, or visit our website
http://www.math.nyu.edu/p̃ach/public_html/combinatorics_seminar.html