Geometry Seminar
October 10, 2006, Tuesday, 6:00 p.m.
Room 613, Courant Institute
251 Mercer Street, New York

Distinct triangle areas in the plane and in 3-space

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Abstract

Erdős, Purdy, and Straus conjectured that n noncollinear points in the plane determine at least $\lfloor \frac{n-1}{2} \rfloor$ triangles of distinct areas, as shown by the example of equally spaced points lying on two parallel lines. It is shown that this number is at least $\frac{17}{38}n - O(1) \approx 0.4473n$. The best previous bound, $(\sqrt{2}-1)n - O(1) \approx 0.4142n$, dates back to 1982 and it follows from the combination of Ungar's theorem on the number of distinct directions determined by n noncollinear points in the plane and a result of Burton and Purdy. It is also shown that n points in three-space, not all on a line, determine at least an almost linear number of triangles with distinct areas that share a common side.

This is joint work with Adrian Dumitrescu.

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