

Geometry Seminar
Tuesday, Nov 15, 2011
Room 512 WWH at 6:00 P.M.

Sylvester-Gallai-like Theorems for Polygons in the Plane

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The Sylvester-Gallai Theorem says that given a finite collection of lines in the projective plane there must be a point where exactly two of the lines intersect - a so-called ordinary point. I consider the analogous problem in the context of simple polygons without holes. Starting with such a polygon P , consider an arbitrary finite set of lines through the interior of P , together with the lines determined by the edges of P . Now consider the vertices, edges and cells of the arrangement that lie on or inside P . I call this set an arrangement in P and derive various Sylvester-Gallai-like Theorems for such arrangements, given various different types of polygons P . I will also consider a colored cousin of the Sylvester-Gallai Theorem, known as the Motzkin-Rabin Theorem, and provide analogs of this Theorem, again in the setting of polygons.

I will describe how these results connect back to a famous problem, which Ricky Pollack calls the Quantitative Sylvester Problem, - namely for n not all coincident lines in the projective plane, how many ordinary points must there be?

For more information please visit the seminar website at:
http://www.math.nyu.edu/seminars/geometry_seminar.html.