
SILVIA FERNANDEZ, California State University, Northridge

Bounding Sylvester's four-point constant and the rectilinear crossing number of the complete graph

In 1865, Sylvester proposed a series of problems falling into a category he called form-probability. In particular, he asked for the chance of the quadrilateral formed by four points, taken arbitrarily within any assigned boundary, being convex. The infimum of these probabilities over all boundaries (open sets in the plane with finite Lebesgue measure) is known as Sylvester's four-point constant. The rectilinear crossing number of the complete graph on n vertices is the minimum number of edge-crossings over all drawings of this graph in the plane, where the vertices are in general position and the edges are straight line segments. In 1994, Scheinerman and Wilf proved a close relationship between Sylvester's four-point constant and the rectilinear crossing number of the complete graph. In this talk, we present the best known bounds for this crossing number, which in turn provide bounds on Sylvester's four-point constant. We focus on the structure of crossing optimal configurations and in particular on exact results for symmetric drawings.