1154-05-571 **Eva Czabarka*** (`czabarka@math.sc.edu`). *Some crossing number results using probabilistic techniques.*

The crossing number of a graph is the minimum number of crossings it can be drawn in a plane. Let $\kappa(n,m)$ be the minimum crossing number of graphs with n vertices and m edges. Erdős and Guy conjectured and Pach, Spencer and Tóth proved that for any $m = m(n)$ satisfying $n << m << n^2$ $\lim_{n\to\infty} \frac{\kappa(n,m)n^2}{m^3}$ exists and is positive. The k-planar crossing number is the minimum crossing number obtained when we partition the edges of the graph into k sub graphs and draw them in k planes. Using designs and a probabilistic algorithm, the guaranteed factor of improvement α_k betwen the k-planar and regular rossing niumber os $\frac{1}{k^2}(1 + o(1))$, while if we restrict our attention to biplanar graphs, this constant is $\beta_k = \frac{1}{k^2}$ exactly. The lower bound proofs require the existence of a midrange crossing constant. Motivated by this, we show that the midrange crossing constant exists for all graph classes (including bipartite graphs) that satisfy certain conditions. The reguklar midrange crossing constant was shown to be is at most $\frac{8}{9\pi^2}$; we present a probabilistic construction that also shows this bound. (Received September 07, 2019)