

1135-05-2100

**Leslie Hogben\*** (hogben@aimath.org). *On crossing numbers of complete multipartite graphs.*

The crossing number  $\text{cr}(G)$  of a graph  $G$  is the minimum number of crossings in a nondegenerate planar drawing of  $G$ . There has been extensive study of crossing numbers of complete bipartite graphs and complete graphs since Turán posed the question for the complete bipartite graph. Much less is known for complete tripartite graphs. Zarankiewicz established an upper bound for  $\text{cr}(K_{n,n})$ . We establish an upper bound for crossing number of the complete tripartite graph analogous to Zarankiewicz's bound.

A complete multipartite graph is balanced if the partite sets all have the same cardinality. Richter and Thomassen proved in 1997 that the limit as  $n \rightarrow \infty$  of  $\text{cr}(K_{n,n})$  over the maximum number of crossings in a drawing of  $K_{n,n}$  exists and is at most  $\frac{1}{4}$ . We show that for a fixed  $r$  and the balanced complete  $r$ -partite graph,  $\zeta(r) := \frac{3(r^2-r)}{8(r^2+r-3)}$  is an upper bound to the limit superior of the crossing number divided by the maximum number of crossings in a drawing.

Joint work with E. Gethner, B. Lidický, F. Pfender, A. Ruiz, Michael Young (Received September 25, 2017)