1146-05-93 **Michael Tait*** (`mtait@cmu.edu`). *The Zarankiewicz problem in 3-partite graphs.*

Let F be a graph, $k \geq 2$ be an integer, and write $\mathrm{ex}_{\chi \leq k}(n, F)$ for the maximum number of edges in an n-vertex graph that is k-partite and has no subgraph isomorphic to F. The function $\mathrm{ex}_{\chi \leq 2}(n, F)$ has been studied by many researchers. Finding $\mathrm{ex}_{\chi \leq 2}(n, K_{s,t})$ is a special case of the Zarankiewicz problem.

We prove an analogue of the Kövári-Sós-Turán Theorem by showing

$$\mathrm{ex}_{\chi \leq 3}(n, K_{s,t}) \leq \left(\frac{1}{3}\right)^{1-1/s} \left(\frac{t-1}{2} + o(1)\right)^{1/s} n^{2-1/s}$$

for $2 \leq s \leq t$.

Using Sidon sets constructed by Bose and Chowla, we prove that this upper bound is asymptotically best possible in the case that $s = 2$ and $t \geq 3$ is odd, i.e., $\mathrm{ex}_{\chi \leq 3}(n, K_{2,2t+1}) = \sqrt{\frac{t}{3}} n^{3/2} + o(n^{3/2})$ for $t \geq 1$.

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