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On the Ramsey-Turán number of finite graphs

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This contains some results of a joint work of P. Erdős,
A. Hajnal, Vera T. Sós and E. Szemerédi

$$\text{Let } a_\ell = \begin{cases} \frac{1}{2} \frac{\ell-3}{\ell-1} & \text{if } \ell \text{ is odd} \\ \frac{1}{2} \frac{3\ell-10}{3\ell-4} & \text{if } \ell \text{ is even} \end{cases} \quad \ell \geq 3$$

Assume $\ell \geq 3$, $k = \lfloor \frac{\ell}{2} \rfloor$. Define $\text{Arb}(\ell)$ as the set of those graphs $G = \langle V, E \rangle$ for which there are sets V_i , $0 \leq i \leq k$ such that $V = V_0 \cup \dots \cup V_k$, the subgraphs $G(V_i)$ spanned by the V_i are forests for $i < k$, $G(V_k)$ has no edge, and $V_k = \emptyset$ if ℓ is even.

Theorem $\forall \ell \geq 3 \quad \forall \epsilon > 0 \quad \forall H \in \text{Arb}(\ell) \exists \delta > 0 \exists n_0$
 $\forall G = \langle V, E \rangle \in \text{Arb}(\ell), \quad |V| = n > n_0, \quad |E| \geq (1 + \epsilon) a_\ell n^2$ and
 $\alpha(G) \leq \delta n$ imply that $H \subset G$.

The result is best possible for $K_\ell \in \text{Arb}(\ell)$.

The case $H = K_\ell$ is a variant of Turán's theorem for graphs G not containing a large independent set.

The general theorem is an Erdős-Stone type generalization of it.