1027-05-198 **Vladimir Nikiforov*** (vnikifrv@memphis.edu). *Spectral supersaturation in graphs.* Preliminary report.

Let G be a graph of order n and $\mu(G)$ be the largest eigenvalue of its adjacency matrix. A recent result states that if G is K_{r+1}-free, then $\mu(G) \leq \mu(T_r(n))$, where $T_r(n)$ is the r-partite Turán graph of order n.

It turns out that if $\mu(G) > \mu(T_r(n))$, then G has an unexpected wealth of subgraphs not present in $T_r(n)$. For instance, let $r = 2$ and $\mu(G) > \sqrt{\lfloor n^2/4 \rfloor} = \mu(T_2(n))$. Then G contains:

(i) all odd cycles of lenght up to $\lceil c_1 n \rceil$;

(ii) $\lceil c_2 n \rceil$ triangles sharing a common edge;

(iii) a complete bipartite graph $K(\lceil c_3 \log n \rceil, \lceil c_3 \log n \rceil)$ with an edge in one of the parts. Here $c_1, c_2, c_3 > 0$ are independent of n.

Similar assertions hold for all $r > 2$.

These results are instances of spectral supersaturation in graphs; for average degree supersaturation was introduced by Erdős and Simonovits in 1983. (Received February 26, 2007)