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Tough graphs and Hamiltonian degree conditions

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A graph $G$ is Hamiltonian if there exists a cycle in $G$ containing all vertices of $G$. A graph $G$ is $t$-tough if, for all subsets of vertices $S$, the number of connected components in $G \setminus S$ is at most $|S|/t$.

In 1995, Hoàng conjectured the following.

Conjecture 1 (Hoàng ([1])) Let $G$ be a graph with degree sequence $d_1, d_2, \ldots, d_n$ and let $t$ be a positive integer.

If $G$ is $t$-tough and if, for all $i$ such that $t \leq i < n/2$, $d_i \leq i d_{n-i+t} \leq n-i$ then $G$ is Hamiltonian.

He proved that conjecture is true for $t \leq 3$. We proved that it is true for $t \leq 6$. To do this, we extended into a version for $t$-tough graphs, the closure lemma due to Bondy and Chvátal.

Références