HEAVY SUBGRAPHS AND THE EXISTENCE OF CYCLES IN 2-CONNECTED GRAPHS

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Let $G$ be a simple 2-connected graph on $n$ vertices. We say that a vertex $v \in V(G)$ is heavy if $d_G(v) \geq n/2$ and that it is super-heavy if $d_G(v) \geq (n + 1)/2$. The well-known theorem due to Fan states that if at least one vertex from every pair of vertices $x, y \in V(G)$ satisfying $d_G(x, y) = 2$ is heavy then $G$ is hamiltonian.

One can demand for this so called Fan-type condition to be satisfied not in the whole graph $G$ but only in some of its induced subgraphs. Let $H$ be a finite family of graphs. We say that $G$ is $H$-f-heavy ($f_1$-heavy) if for every induced subgraph $H$ of $G$ isomorphic to one of the graphs from $H$ and for every two vertices $x, y \in V(H)$ $d_G(x, y) = 2$ implies that at least one of them is heavy (super-heavy).

In this talk we will present pairs and triples of subgraphs for which $G$ being -f-heavy ($f_1$-heavy) implies that $G$ is hamiltonian (pancyclic).

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