Forbidden graphs and group connectivity

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Tutte and Jaeger *et al.* posed the following conjectures.

Conjecture 1. (Tutte, 1954) Every 4-edge-connected graph admits nowhere-zero Z_3-flow.

Conjecture 2. (Jaeger et al., 1992) Every 5-edge-connected graph is Z_3-connected.

Many researchers have devoted themselves to the study of nowhere-zero flows and group connectivity. Recently, Thomassen confirmed the weak 3-flow conjecture, which was further improved by Lovász, Thomassen, Wu and Zhang who proved that every 6-edge-connected graph is Z_3-connected. However, Conjectures 1 and 2 are still open.

Conjecture 2 implies Conjecture 1 by a result of Kochol that reduces Conjecture 1 to 5-edge-connected graphs. Moreover, it is proved that Conjecture 2 can be reduced to 5-edge-connected claw-free graphs.

On the other hand, it is known that every hamiltonian graph admits a nowhere-zero 4-flow and there are some graphs which are hamiltonian but do not admit a nowhere-zero 3-flow (for example K_4). Thus, a lot of degree conditions for the existence of Hamiltionian cycle are used to investigate nowhere-zero 3-flows and Z_3-connectivity of graphs. It is natural to ask whether or not there are some other sufficient conditions for the existence of Hamiltionian cycle are also available for the existence of nowhere-zero 3-flows and Z_3-connectivity.

In this talk, we will present some results about $K_{1,3}$-free graphs and Z_3-connectivity.