1096-05-1315 **Cun-Quan Zhang***, Math. Dept., West Virginia University, Morgantown, WV 26506-6310.
Tutte's 5-flow conjecture and Jaeger's modulo 5-orientation.

Let G be a graph with an orientation D. A mapping f: $E(G) \mapsto Z_k - \{0\}$ is called *a nowhere-zero k-flow* if, for every vertex $v \in V(G)$,

$$\sum_{e \in E^+(v)} f(e) \equiv \sum_{e \in E^-(v)} f(e) \pmod{k}.$$

The integer flow problem is a dual of the vertex coloring problem: it is pointed out by Tutte that a planar graph G admits a nowhere-zero k-flow if and only if G is k-face-colorable. Tutte (1954) conjectured that *every bridgeless graph admits a nowhere-zero 5-flow.* Jaeger (1988) pointed out that *if every 9-edge-connected graph has a modulo 5-orientation D (that is, for every vertex $v \in V(G)$, $d^+_D(v) \equiv d^-_D(v) \pmod 5$), then every bridgeless graph admits a nowhere-zero 5-flow.* It is first proved by Thomassen (2012) that *every 55-edge-connected graph has a modulo 5-orientation.* This result is further improved recently that *every 12-edge-connected graph has a modulo 5-orientation.* (Joint work with M. Lovász, C. Thomassen, Y. Wu.) (Received September 14, 2013)