

Nowhere-zero flows of graphs

A graph G has a nowhere-zero k -flow if the edges of G can be oriented and assigned non-zero integers from the interval $(-k, k)$ such that for every vertex, the sum of the values on incoming edges equals the sum on the outgoing ones. This concept was introduced by Tutte in 1945. He showed that each planar graph is k -face colourable if and only if it has a nowhere-zero k -flow. There are three celebrated conjectures in this field, all due to Tutte. In sequel Jaeger et al. introduced the concept of group connectivity of graphs as an extension of nowhere-zero flows. We will discuss the most important results on nowhere-zero flows and the concept of group connectivity.