

Cores, joins and the Fano-flow conjectures

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(joint work with Ligang Jin and Giuseppe Mazzuocolo)

The Fan-Raspaud Conjecture states that every bridgeless cubic graph has three 1-factors with empty intersection. A weaker one than this conjecture is that every bridgeless cubic graph has two 1-factors and one join with empty intersection. Both of these two conjectures can be related to conjectures on Fano-flows on cubic graphs. We introduce the concept of cores of cubic graphs which provides new insight into their structure. We show that these two conjectures are equivalent to some statements on cores and weak cores of a bridgeless cubic graph. In particular, we prove that the Fan-Raspaud Conjecture is equivalent to the statement that every bridgeless cubic graph has a triangle free core. The weak oddness of a cubic graph G is the minimum number of odd components in the complement of a join of G . We obtain an upper bound of weak oddness in terms of weak cores, and thus an upper bound of oddness in terms of cores as a by-product.