Brijder, Robert; **Traldi, Lorenzo**
Isotropic matroids. III: Connectivity. (English) Zbl 1366.05062
Electron. J. Comb. 24, No. 2, Research Paper P2.49, 25 p. (2017).

Summary: The isotropic matroid $M[IAS(G)]$ of a graph G is a binary matroid, which is equivalent to the isotropic system introduced by Bouchet. In this paper we discuss four notions of connectivity related to isotropic matroids and isotropic systems. We show that the isotropic system connectivity defined by Bouchet is equivalent to vertical connectivity of $M[IAS(G)]$, and if G has at least four vertices, then $M[IAS(G)]$ is vertically 5-connected if and only if G is prime (in the sense of Cunningham's split decomposition). We also show that $M[IAS(G)]$ is 3-connected if and only if G is connected and has neither a pendant vertex nor a pair of twin vertices. Our most interesting theorem is that if G has $n \geq 7$ vertices then $M[IAS(G)]$ is not vertically n-connected. This abstract-seeming result is equivalent to the more concrete assertion that G is locally equivalent to a graph with a vertex of degree $< \frac{n-1}{2}$.

For Part II see [the authors, ibid. 23, No. 4, Research Paper P4.2, 38 p. (2016; Zbl 1351.05044)].

MSC:

05C40	Connectivity
05B35	Combinatorial aspects of matroids and geometric lattices
52B40	Matroids in convex geometry (realizations in the context of convex polytopes, convexity in combinatorial structures, etc.)

Keywords:

circle graph; connectivity; degree; isotropic system; local equivalence; matroid; pendant; prime; split; twin

Software:

GENREG; nauty; SageMath; Traces

Full Text: Link