

Circular Orderings of Matroids

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(joint work with Stéphan Thomassé)

We discuss progress regarding two problems about the possibility of ordering the elements of a matroid in a circular fashion :

Problem 1

Suppose B_1, \dots, B_k are k bases of a matroid of rank r . Can we put the $k \cdot r$ elements of these bases in a cyclic ordering in which every interval of r consecutive elements is a base? This is actually a special case of a more general conjecture by Kajitani, *et al.* (1988).

Problem 2

Let S_d be the topological cycle with circumference d . Given a matroid \mathcal{M} with ground set E , we want to map the elements in E to S_d , so that for every unit interval the elements mapped into that interval form an independent set in \mathcal{M} . What is the minimum value of d for which this is possible?

Daniel Gonçalves conjectured in his PhD thesis (2006) (and at the previous meeting GT 2005 in Nyborg) that for graphical matroids, the minimum value is in fact equal to the *fractional arboricity* $\max_{\emptyset \neq A \subseteq E} \frac{|A|}{r(A)}$.