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Coparking functions and h -vectors of matroids

The h -vector of a simplicial complex X is a well-studied invariant with connections to algebraic aspects of its Stanley-Reisner ring. When X is the independence complex of a matroid Stanley has conjectured that its h -vector is a 'pure O-sequence', i.e. the degree sequence of a monomial order ideal where all maximal elements have the same degree. The conjecture has inspired a good deal of research and is proven for some classes of matroids, but is open in general. Merino has established the conjecture for the case that X is a cographical matroid by relating the h -vector to properties of chip-firing and ' G -parking functions' on the underlying graph G . We introduce and study the notion of a 'coparking' function on a graph (and more general matroids) inspired by a dual version of chip-firing. As an application we establish Stanley's conjecture for certain classes of binary matroids that admit a well-behaved 'circuit covering'. Joint work with Kolja Knauer.