

Enumerating alternating cycles in posets

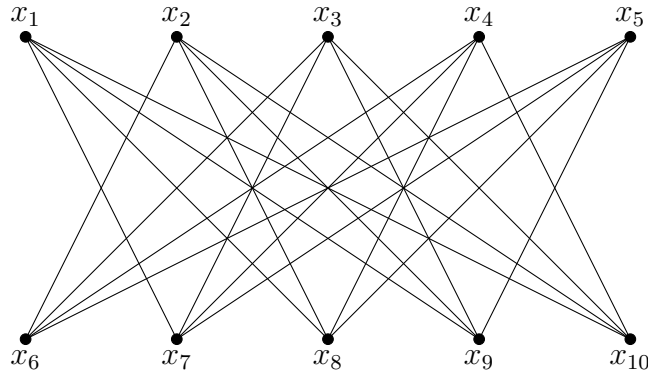
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Abstract

For a poset $\mathbf{P} = (X, \leq)$ an *alternating cycle* S is a cyclically ordered tuple

$$S = [(x_1, y_1), (x_2, y_2), \dots, (x_k, y_k)]$$

where (a) each (x_i, y_i) is an ordered tuple of incomparable elements of $\mathbf{P}$ and (b) $y_i \leq x_{i+1}$ for each i in a cyclic fashion modulo k . These are dual to the edges of hypergraphs whose weak chromatic number is equal to the dimension of $\mathbf{P}$, and so are of some interest. This talk will establish upper bounds on the number of (strict) alternating cycles as a function of $|X| = n$ and the width $w(\mathbf{P})$ of $\mathbf{P}$ along with asymptotics of the unique poset of cardinality n with the most alternating cycles.



A poset of dimension 5

Keywords: Poset, alternating cycle, strict alternating cycle, hypergraph, chromatic number