Cyclic chain decomposition method for forbidding subposets

Abhishek Methuku, CEU

(joint work with Casey Tompkins.)

We introduce a new method for determining the size of the largest family of subsets of $[n]$ not containing any of one or more given posets as a weak subposet. The method involves decomposing the set of intervals along a cyclic permutation into chains of a certain type called as "Oscillating chains" and considering the interaction between consecutive Oscillating chains. In particular, we consider a poset which strictly contains the butterfly poset as a subposet and show that the same bound holds, thereby generalizing a result of DeBonis, Katona and Swanepoel. We determine $La(n, P_1, P_2)$ for an infinite set of pairs (P_1, P_2), one of which provides a second generalization of their result. Other possible decompositions of the set of intervals and a conjecture will be presented.