



Mathematics and CS Seminar

GeomTop Seminar: "Chromatic number of Kneser hypergraphs and a conjecture of Frick"

Amir Jafari

Host: Uli Wagner

This will be a report of a recent joint work with Soheil Azarpendar. For integers n, k, r where $n > kr-1$ The Kneser hypergraph $KG^r(n, k)$ was defined by Lovasz, Alon and Frankl as the r -uniform hypergraph with all k -subsets of $\{1, \dots, n\}$ as vertices and its hyperedges are all r -subsets $\{A_1, \dots, A_r\}$ of vertices that are pairwise disjoint. It was proved by them using topological methods that its chromatic number is the ceiling of $(n-r(k-1))/(r-1)$. Ziegler conjectured that if we take the induced sub hypergraph whose vertices are all r -stable (i.e subsets that for any two distinct elements i and j in them $r-1 < |i-j| \leq 2$). In this talk we prove a weaker version of this conjecture, due to Frick et al, that states if $\{P_1, \dots, P_t\}$ is a partition of $\{1, \dots, n\}$ where the size of each P_i is at most r and we take the induced sub hypergraph of $KG^r(n, k)$ whose vertices are those k -subsets that have at most one element from each P_i then we still get the same chromatic number. Our proof for this conjecture is combinatorial and uses \mathbb{Z}_p Tucker lemma. If time permits some topological methods related to similar problems will be explained.

Wednesday, March 4, 2020 01:00pm - 02:15pm

Mondi Seminar Room 3, Central Building



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