SCMS Seminar

Reconstruction from the Deck of k-Vertex Induced Subgraphs

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Venue: Room 2213, East Main Guanghua Tower, Handan Campus

Abstract: The k-deck of a graph G is its multiset of subgraphs induced by k vertices; we ask when the k-deck determines G. Let $n=|V(G)|$. The famous Reconstruction Conjecture is that the $(n-1)$-deck determines G when $n\ge3$. Always the k-deck determines the $(k-1)$-deck, so the natural question is to find the least k such that the k-deck determines G.

An easy first result is that a complete r-partite graph is determined by its $(r+1) $-deck. We then generalize a result of Bollobas by showing that for $l = (1-o(1)) n/2$, almost every graph G is determined by various sets of ${l+2\choose 2}$ subgraphs with $n-l$ vertices. However, when $l=n/2$, the entire $(n-l) $-deck does not always determine whether G is connected (it fails for n-vertex paths). We strengthen a result of Manvel by proving for each l that when n is sufficiently large (at least $l ^ {l^2}$), the $(n-l)$-deck determines whether G is connected ($n\ge25$ suffices when $l=3$). Finally, for every graph G with maximum degree 2, we determine the least k such that G is reconstructible from its k-deck, which involves extending a result of Stanley.

These results are joint work with Hannah Spinoza.

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