COLLOQUIUM

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Connection between embeddings and combinatorics

Mathematics and Statistics

Date: Friday January 17, 2020
Time: 3:30 - 4:30 PM
Room: **Math Lounge CW 307.20 (EXCEPTIONALLY)**

Abstract: Given two manifolds M and N, an embedding of M in N is basically an injective map $f\colon M \to N$ such that its derivative is injective everywhere. Two embeddings are the same or isotopic if one can "distort" one into the other without "breaking it". A basic question one can ask is the following: how many different ways can one embed M in N? When M is the circle and N is $\mathbb{R}^n$, $n > 3$, the answer is trivial in the sense that two embeddings of S^1 in $\mathbb{R}^n$ are always isotopic. For $n = 3$, the question is more intricate. In this talk, we will discuss the case where M is a bunch of spheres or a bunch of Euclidean spaces and $N = \mathbb{R}^n$. In particular, we will see that if the codimension is high, the set of isotopy classes of embeddings of M in N is a finitely generated abelian group. The proof of this uses the theory of manifold calculus and graph complexes whose graphs are similar to Feynman diagrams from particle physics. These will be recalled.

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