Algebra/Topology Seminar

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An Application Of Persistent Homology To Hockey Analytics

Thursday, October 9, 2014
1:15 p.m. in ES-143

Abstract. I will apply the major computational tool from Topological Data Analysis (TDA), persistent homology, to discover patterns in the data related to professional sports teams. I will use official game data from the North-American National Hockey League (NHL) 2013–2014 season to discover the correlation between the composition of NHL teams with the currently preferred offensive performance markers. Specifically, I use the program Team-Plex (based on the JavaPlex software library) to generate the persistence bar-codes. TeamPlex is applied to players as data points in a multidimensional (up to 12-D) data space where each coordinate corresponds to a selected performance marker.

The conclusion is that each team's offensive performance (measured by the popular characteristic used in NHL called the Corsi number) correlates with two bar-code characteristics: greater *sparsity* reflected in the longer bars in dimension 0 and lower *tunneling* reflected in the low number/length of the 1-dimensional classes. The methodology can be used by team managers in identifying deficiencies in the present composition of the team and analyzing player trades and acquisitions. I will show an example of a proposed trade which should improve the Corsi number of the team.