Michigan Math Club

Thursday at 4pm in the Commons
Free Pizza and Pop

Brunn-Minkowski Inequality

Mark Rudelson

Consider two "nice" (say, convex) sets in R^n, and define their sum pointwise, i.e. assume that the set U+V consists of points u+v, where u is in U and v is in V. For example, the sum of two orthogonal intervals is a rectangle. The Brunn-Minkowski inequality provides a lower bound for the volume of the sum in terms of volumes of the sets. This is one of the fundamental results in convex geometry, with applications ranging from geometry itself, to probability and functional analysis. In this talk we will give an elementary proof of the Brunn-Minkowski inequality, and consider a few of its applications. One of such applications is the isoperimetric inequality, claiming that among the sets of a given volume, the ball has the least surface area. If time allows, an application to probability will be also discussed.