

# Michigan Math Club

Thursday at 4pm in the Commons

Free Pizza and Pop



## Fritz John's Ellipsoid Ben Weiss

Abstract for 21 January 2010



What is the largest ellipsoid that fits inside a cube? It can be shown that it is a sphere. Fritz John proved that every convex body  $B$  (in any dimension) contains a unique ellipsoid  $E$  of maximal volume. Furthermore the contact points of the ellipsoid with  $B$  give directions (from the ellipsoid center) that span the whole space. We will prove this result, and use it to estimate how many faces a polyhedron must have to approximate a sphere to given precision.