PHYSICAL MATHEMATICS SEMINAR

THE IDEAL PILLOW SHAPE

IGOR PAK
Massachusetts Institute of Technology

ABSTRACT:

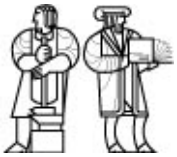
Think of a pillow as being made of two square pieces of bendable but non-stretchable material, which are glued along the boundary and inflated as much as possible. What can be said about this ideal pillow shape? Is it smooth? Are there any crumples or crimps? What is its volume? Can we at least simulate the surface?

We will address all these questions in a more general setting. I will start with the origin of this problem in polyhedral combinatorics, and present a number of examples (such as cubic and circular pillow). I will then discuss my findings in the form a series of conjectures on the geometry of ideal shapes. At the end I will discuss my (positive) resolution of Bleecker's conjecture, which says, essentially, that the ideal pillow shapes cannot be polyhedral.

If time permits, I will also explain what happens in higher dimensions, mention some elements of the proof and explain the connection to classical constructions of Archimedean solids.

TUESDAY, OCTOBER 31, 2006
2:30 PM
Building 4, Room 270

Refreshments at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)



Massachusetts Institute of Technology
Department of Mathematics
Cambridge, MA 02139