Discrete Mathematics Seminar

Time:	Friday, 4 February 2011, 12:30–1:30 PM
Location:	238 Derrick Hall
Title:	Some Geometry in ℓ^2
Speaker:	Sam Creswell, Department of Mathematics, San Antonio College

Abstract:

In 1949 Victor Klee used Hamel Bases, which depend upon the Axiom of Choice, to show that any Banach space B contains uncountably many mutually disjoint convex subsets, each of which is dense in B. My work is restricted to ℓ^2. The first paper showed, without using the Axiom of Choice, that ℓ^2, which is isomorphic to every Hilbert space, contains uncountably many mutually disjoint affine subsets, each of which is dense in ℓ^2. Further, that paper shows that any sphere in ℓ^2 contains uncountably many mutually disjoint path-connected subsets, each of which is dense in the sphere.

The second paper shows that every sphere S in ℓ^2 contains uncountably many mutually disjoint subsets, each of which is dense in S, simply connected, contractible, and Frechet differentiable.

Note that an affine space is necessarily convex. Further, a search of MathSciNet did not find a prior reference to any type of connected subsets of the sphere in ℓ^2 or any other Banach space.