Undergraduate Math Club
Winter 2008
2nd floor Nesbitt Common Room
Thursday, March 27, 4:10-5:00pm
(free pizza and pop, as always)

Hypercomplex numbers

Dave Anderson

Abstract

The complex numbers form a ``2-dimensional'' algebra; they give a way to multiply (and divide) pairs of real numbers. Can you do the same in 3 dimensions? Hamilton spent almost 10 years in the mid-19th century wondering about this, before he gave up and worked out how to make a 4-dimensional algebra instead, called the quaternions. Not long after, Graves and Cayley found an 8-dimensional version: the octonions. I will speak about how to construct all of these numbers and more, and explain what they have to do with sphere packing and the following remarkable theorem: a product of two sums of 8 perfect squares is also a sum of 8 perfect squares.