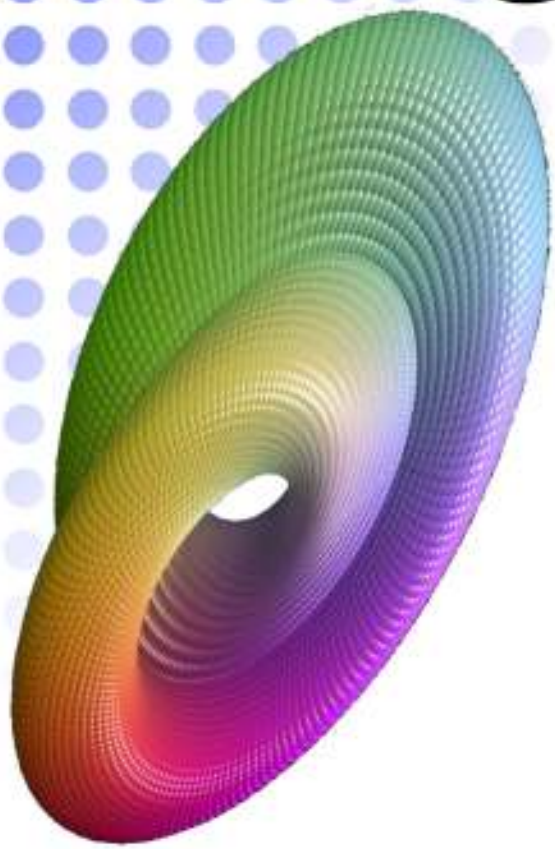
Michigan Math Club

Thursday at 4pm in the Commons

Free Pizza and Pop



Let's count linearly independent vectors!

Steven Damelin

Abstract for 19 February 2015

Suppose you have a collection of binary vectors of length $n \geq 1$ and would like to choose maximal subsets of these that are linearly independent $k \leq n$ at a time. Apart from the zero vector, all vectors are linearly independent one at a time and in fact, if $n \geq 2$, two at a time as well because the vectors are binary (the entries are only zeroes and ones). Thus, if $k = 1, 2$, the answer is 2^n-1. What if $k \geq 3$?

We will study this question and show that it relates to codes, cryptography, geometries, packings, and wireless communications.