

Mathematical Research at Notre Dame



Speaker: Roxana Smarandache
University of Notre Dame

Friday, October 11, 2013
4:00 pm
Room: 229 Hayes-Healy Hall

Title: Research problems in coding theory/applied algebra and linear algebra/applied combinatorics

Abstract:

This talk will give a simple introduction to the main objects and interests in coding theory, followed by a few directions for graduate theses.

In short, codes are subspaces over a finite field; the metric of interest is the Hamming distance, measuring the number of positions in which two vectors are distinct. The main problem in coding theory is to find k -dimensional subspaces C of $(GF(q))^n$ with both k/n and the minimum of all Hamming distances in C large (called good codes), and give an implementable algorithm that can associate to a given arbitrary vector y in $(GF(q))^n$ a vector x in C of distance $d(x, y)$ which is minimal among all distances of such pairs (called a decoding algorithm).

Finding good codes, classifying and analyzing existent codes, are all interesting topics of research from both practical and theoretical points of view. In the talk I will show some simple examples of codes and decoding algorithms, I will talk about the practical importance of codes, about the mathematics involved in coding research, and will try to give some topics that could constitute starting points for graduate theses.