



Algebra and Number Theory Seminar

Title: On Sparseness of MRD codes and Semifields

Speaker: Heide Gluesing-Luerssen (Kentucky)

Date: Thu 12th September 2019 at 2:00PM

Location: Seminar Room SCN 1.25

Abstract: Rank-metric codes are subspaces of a full matrix space over a finite field, and where we endow the matrix space with the rank metric: $d(A,B)=\text{rk}(A-B)$. The rank distance of such a code is defined as the minimum rank of all its nonzero elements. The question arises as to how large a rank-metric code can be for a given rank distance. Codes with the maximum size are called MRD codes (maximum rank distance codes). In this talk I will discuss the proportion of MRD codes within the space of all rank-metric codes of the same dimension. More specifically, I will consider the asymptotic behavior of this proportion as the field size tends to infinity. It turns out that, for instance, $[3 \times 2; 2]$ -MRD codes have an asymptotic proportion of $1/3$. On the other hand, for $[3 \times 3; 3]$ -MRD codes this asymptotic proportion is zero, and therefore we call this class of MRD codes sparse. The proof of the sparsity follows from a parametrization of 3-dimensional semifields by Menichetti (1973). I will discuss the relation between MRD codes and semifields and present the main steps of the proof.

https://maths.ucd.ie/kazim_b/UCD_ANT_seminar.html