Monday 17th May 2021 – at 15.30
Virtual conference on Webex

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A geometric interpretation of minimal codes

Abstract: In a given linear code, a codeword is said to be minimal if its support does not contain the support of any other independent codewords. The study of minimal codewords of a linear code was motivated by their use for realizing perfect and ideal secret sharing schemes. However, it is in general a difficult task to determine the minimal codewords of a given linear code. It is instead easier to design linear codes whose codewords are all minimal. Codes with this property are called minimal, and for this reason they have been intensively studied in the last few years.

In this talk we analyze the geometric point of view of minimal linear codes. Using the well-known correspondence between [n,k] codes over a finite field F_q and [n,k]_q projective systems in PG(k-1,q), it has been shown that equivalence classes of minimal linear codes are in one-to-one with equivalence classes of cutting blocking sets. Exploiting this characterization we are able to prove bounds on length and minimum distance of a given minimal code of dimension k over F_q. Moreover, we also obtain that the family of minimal linear codes is asymptotically good. We conclude the talk showing few constructions and discussing some open problems. Joint work with Martino Borello, Alessandro Neri and Alberto Ravagnani.

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