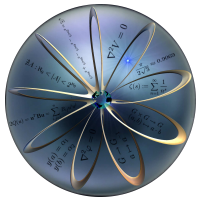

planetmath.org

Math for the people, by the people.

linear code

Canonical name	LinearCode
Date of creation	2013-03-22 14:21:24
Last modified on	2013-03-22 14:21:24
Owner	mathcam (2727)
Last modified by	mathcam (2727)
Numerical id	7
Author	mathcam (2727)
Entry type	Definition
Classification	msc 94B05
Related topic	CyclicCode
Related topic	WeightEnumerator
Related topic	DualCode
Related topic	EvenCode
Related topic	AutomorphismGroupLinearCode
Defines	binary code
Defines	ternary code
Defines	quaternary code
Defines	dimension of a linear code

Often in coding , a code's alphabet is taken to be a finite field. In particular, if A is the finite field with two (resp. three, four, etc.) elements, we call C a binary (resp. ternary, quaternary, etc.) code. In particular, when our alphabet is a finite field then the set A^n is a vector space over A, and we define a *linear code over* A of block length n to be a subspace (as opposed to merely a subset) of A^n. We define the *dimension of* C to be its dimension as a vector space over A.

Though not sufficient for unique classification, a linear code's block length, dimension, and minimum distance are three crucial parameters in determining the strength of the code. For referencing, a linear code with block length n, dimension k, and minimum distance d is referred to as an (n, k, d)-code.

Some examples of linear codes are Hamming Codes, BCH codes, Goppa codes, Reed-Solomon codes, and the `http://planetmath.org/BinaryGolayCode`Golay code.