

# ON TOWERS OVER FINITE FIELDS

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A tower of curves over a finite field  $k$  is an infinite sequence of curves  $C_m$  and of maps from  $C_m$  to  $C_{(m-1)}$ , both defined over  $k$ , with genus  $g(C_m)$  growing to infinity. A tower has a fundamental behavior of the ratios of the number of rational points of the curve  $C_m$  by its genus  $g(C_m)$ .

A linear  $k$  is just a subspace of the vector space  $k^n$ .

We shall motivate the study of towers by the connection to the asymptotic theory of codes. For this application to Coding Theory, the tower should be explicit; i.e., the curves  $C_m$  are explicitly given by polynomial equations with coefficients in the finite field  $k$ .

We shall survey some explicit constructions of towers over finite fields obtained together with H. Stichtenoth, and relate them with results by Thara, Serre, Geer-Vlugt, Zink.

This talk should be accessible to a general audience.