Explicit Construction of Codes beyond the Gilbert-Varshamov Bound

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The Gilbert-Varshamov bound guarantees the existence of long linear codes with good error-correcting properties. As it was shown by Tsfasman, Vladut and Zink, there exist even better codes over finite fields of square order. However, their construction (using modular curves) is not of practical interest since the complexity of constructing these codes is very high.

In this talk I give a brief survey of these results, and I will describe an algorithm for an efficient construction of codes which attain the Tsfasman-Vladut-Zink bound. The algorithm is based on an explicit tower of function fields with (asymptotically) many rational places.