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In this approach, we generalize the notion of cyclic code and construct codes via ideals in finite quotients of non commutative polynomial rings, so called skew polynomial rings of automorphism type. Since there is no unique factorization in skew polynomial rings, there are much more ideals and therefore much more codes than in the commutative case.

We propose a method to construct block codes of prescribed rank and a method to construct block codes of prescribed distance (joint work with L. Chaussade and P. Loidreau). Also, using Groebner bases, we computed all Euclidean and Hermitian self-dual linear codes over  $\mathbb{F}_4$  of this type of length less than 40, including a [36, 18, 11] Euclidean self-dual code which improves the previously best known self-dual linear codes over  $\mathbb{F}_4$  (joint work with D. Boucher) (Received January 11, 2009)