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Section:

3. Number Theory and Arithmetic Algebraic Geometry

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Group algebras and codes

Using the group algebra of an abelian group and a *splitting* of the group, we construct a class of $[n, (n+1)/2]$ codes such that the minimum distance outside of a certain subcode is $\geq \sqrt{n}$, a well-known bound for quadratic residue codes. The construction yields quadratic residue codes, generalised quadratic residue codes, duadic codes and Q-codes as special cases. We show that the split codes so constructed *properly* contain the above classes of codes and that new codes arise even over $\mathbb{F}_2$. This is joint work with C. S. Ding and D. R. Kohel.