

New Results on Equivalence of Cyclic Codes and a Generalization of a Search Algorithm

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A fundamental and challenging problem in coding theory is to construct linear codes with best possible parameters. A search algorithm (ASR) on certain types of quasi-twisted (QT) codes has been very fruitful to address this problem. We recently generalized the ASR algorithm to make it more comprehensive. The generalization is based on code equivalence. We prove several useful theoretical results about the equivalence of cyclic codes, constacyclic codes, and QT codes. As a result of implementing the more general search algorithm, we discovered many new linear codes over several small finite fields. We then extended our results to the case of repeated root cyclic codes.

Keywords: cyclic codes, equivalent codes, best-known codes