

Abstract

Locally repairable codes (LRCs) have attracted a lot of interest due to their important applications in distributed storage systems. An LRC is a linear code such that every code symbol can be recovered by accessing a small number of other code symbols. In this talk, we study bounds and constructions of LRCs from the viewpoint of parity-check matrices. Firstly, a simple and unified framework based on parity-check matrix to analyze the bounds of LRCs is proposed. Some structural properties on optimal LRCs that achieve the Singleton-like bound are given. Then, we focus on constructions of optimal LRCs attaining the Singleton-like bound over some small finite fields, i.e., the binary, ternary and quaternary fields. We completely determined all the possible parameters of optimal LRCs over these small fields and explicit construction of these optimal LRCs are given by presenting their parity-check matrices. Finally, the generalized Hamming weights and weight distributions of some classes of optimal LRCs are determined.