

## Storage Codes on Triangle-Free Graphs

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This is joint work with Haihua Deng, Hexiang Huang, Guobiao Weng.

Abstract: Consider a simple, connected graph  $\Gamma$  with  $n$  vertices. Let  $C$  be a code of length  $n$  with its coordinates corresponding to the vertices of  $\Gamma$ . We define  $C$  as a *storage code* on  $\Gamma$  if, for any codeword  $c \in C$ , the information at each coordinate of  $c$  can be recovered by accessing its neighboring coordinates. The main problem here is to construct high-rate storage codes on triangle-free graphs. In this paper, we employ the polynomial method to address a question asked by Barg and Zémor in 2022, demonstrating that the BCH family of storage codes on triangle-free Cayley graphs achieves a unit rate. Furthermore, we generalize the construction of the BCH family and obtain more storage codes of unit rate on triangle-free graphs. We also compare the BCH family with the other known constructions by examining the rate of convergence of  $1/(1 - R(C_n))$  with respect to the length  $n$ , where  $R(C_n)$  is the rate of code  $C_n$ . At last, we reveal a connection between the storage codes on triangle-free graphs and the Ramsey number  $R(3, t)$ , which leads to an upper bound for the rate of convergence of  $1/(1 - R(C_n))$ .