

# Combinatorial Batch Codes

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**Abstract:** Batch codes were introduced by Ishai, Kushilevitz, Ostrovsky and Sahai in 2004. A batch code specifies a method to encode a string  $x$  into an  $m$ -tuple of strings stored on  $m$  distinct servers, such that any subset of  $k$  symbols from  $x$  can be retrieved by reading at most  $t$  symbols from each server. The goal is to keep the “load”  $t$  small, while also minimizing the total storage size.

The problem is motivated by applications to load balancing in distributed storage, private information retrieval and cryptographic protocols. It also raises interesting theoretical questions related to the study of optimal parameters of batch codes. Batch codes can be viewed as a common relaxation of expander graphs and locally decodable codes.

Combinatorial batch codes are purely replication based batch codes, where each server stores a subset of symbols of the string  $x$ . We give optimal constructions of combinatorial batch codes for a new range of parameters. Our constructions are based on transversal designs.

This is joint work with Natalia Silberstein.