Abstract:

We show that there exist binary locally testable codes (for all rates) and locally correctable codes (for low rates) with rate and distance approaching the Gilbert-Varshamov bound (which is the best rate-distance tradeoff known for general binary error-correcting codes). Our constructions use a number of ingredients: Thommesen's random concatenation technique, the Guruswami-Sudan-Indyk strategy for list-decoding concatenated codes, the Alon-Edmonds-Luby distance amplification method, and the local list-decodability and local testability of Reed-Muller codes. Interestingly, this seems to be the first time that local testability is used in the construction of locally correctable codes.

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