

This book is based on my doctoral research, undertaken at Department of Mathematics, University of Delhi, India. The nature of burst errors differ from channel to channel depending upon the type of channels or the kind of errors which occur during the process of data transmission. A new kind of burst error viz., repeated burst error has been introduced and the codes that can detect and correct repeated bursts have been discussed. The investigations in this book are on bounds on the number of parity-check digits required for linear codes capable of detecting and correcting repeated bursts and repeated low-density bursts. An algorithm for the construction of a parity-check matrix of a code capable of correcting repeated burst errors has been proposed. The study of these codes is important not only from mathematical point of view but also from application point of view. The development of codes detecting and correcting such errors may prove to be useful for channels already dealing with multiple burst errors improving upon their efficiency.

Error Detecting and Correcting Codes



Dr. Rashmi Verma is Assistant Professor at Department of Mathematics, Mata Sundri College for Women, University of Delhi, India. She completed M.Phil. and Ph.D. from Department of Mathematics, University of Delhi. Her research interest is Algebraic Coding Theory.

Repeated
Detecting and



978-3-659-94360-7

Verma

Contents

1	Introduction	1
1.1	Coding Theory: An Overview	1
1.2	Error Detection and Correction	4
1.3	Terminologies and Preliminaries	5
1.4	Burst Errors	6
1.5	Repeated Burst Errors	8
1.6	Repeated Low-density Burst Errors	9
1.7	Bounds	10
1.8	Book Outline	12
2	Repeated Burst Error Detecting Linear Codes	15
2.1	2-Repeated Burst Error Detecting Codes	16
2.2	Simultaneous Detection and Correction of 2-Repeated Burst Errors . . .	22
2.3	m -Repeated Burst Error Detecting Codes	22
2.4	Simultaneous Detection and Correction of m -Repeated Burst Errors . .	23
3	Repeated Burst Error Correcting Linear Codes	25
3.1	Correction of 2-Repeated Bursts	25
3.2	Detection and Correction of m -Repeated Burst Errors	48
4	Repeated Low-density Burst Error Detecting Linear Codes	61
4.1	2-Repeated Low-density Burst Error Detecting Codes	62
4.2	Simultaneous Detection and Correction of 2-Repeated Low-density Burst Errors	70
4.3	Detection and Correction of m -Repeated Low-density Burst Errors	71
5	2-Repeated Low-density Burst Error Correcting Linear Codes	73
5.1	Correction of 2-Repeated Low-density Bursts	73

6 Limitations and Future Work	123
Bibliography	125