Coding Theory

CO 331

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LaTeXed by Sibelius Peng

Preface

Disclaimer Much of the information on this set of notes is transcribed directly/indirectly from the lectures of CO 331 during Winter 2020 as well as other related resources. I do not make any warranties about the completeness, reliability and accuracy of this set of notes. Use at your own risk.

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Sibelius Peng

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Intro

Example: **Replication code**

source msgs		codewords
0	→	0
1	→	1

# of errors/codeword that be detected: 0
errors/codeword that can be corrected: 0
Rate: 1

---

source msgs		codewords
0	→	00
1	→	11

# of errors/codeword that be detected: 1
errors/codeword that can be corrected: 0
Rate: 1/2

---

source msgs		codewords
0	→	000
1	→	111

# of errors/codeword that be detected: 2
errors/codeword that can be corrected: 1 (nearest neighbour decoding)
Rate: 1/3

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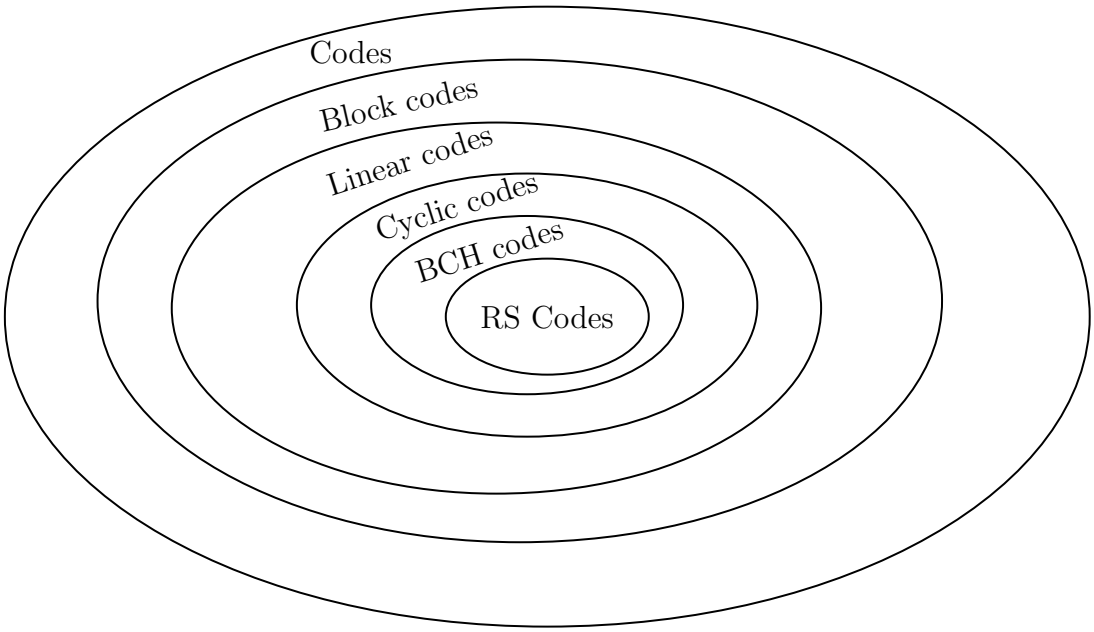
source msgs		codewords
0	→	00000
1	→	11111

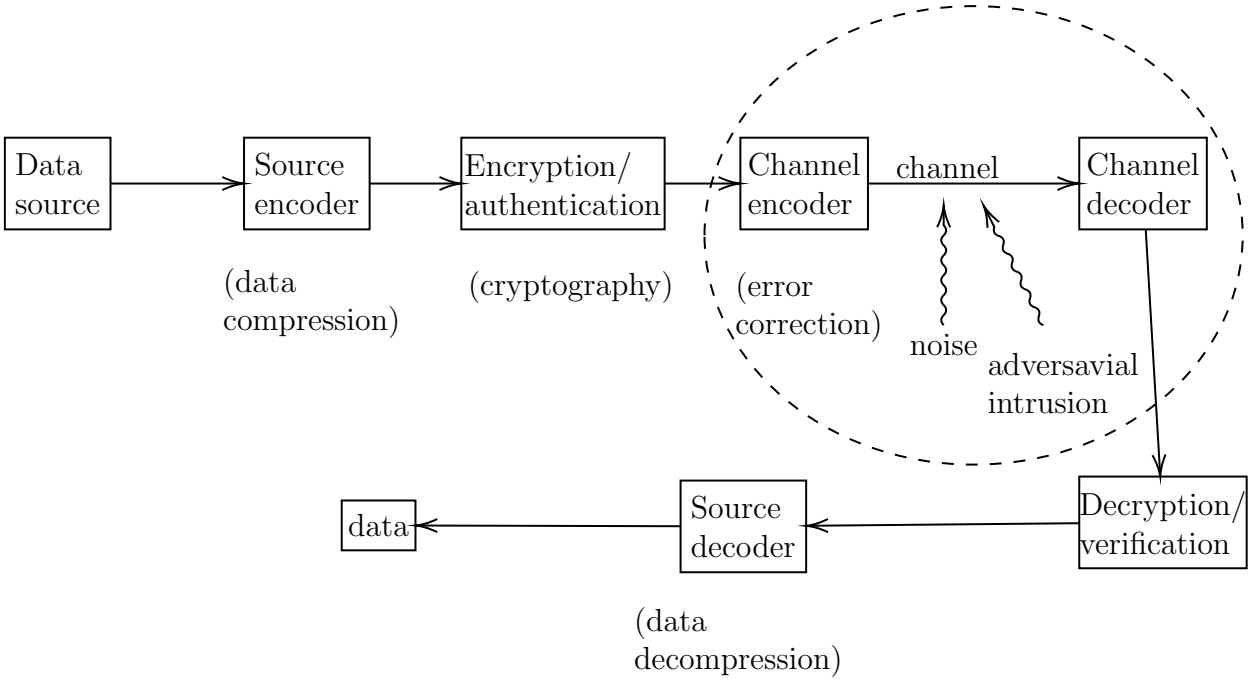
# of errors/codeword that be detected: 4
errors/codeword that can be corrected: 2 (nearest neighbour decoding)
Rate: 1/5

Goal of Coding Theory Design codes so that:

1. High information rate
2. High error-correcting capability
3. Efficient encoding & decoding algorithms



The big picture In its broadest sense, coding deals with the reliable, efficient, secure transmission of data over channels that are subject to inadvertent noise and malicious intrusion.



mid: Feb 26th