

Bibliographic Reference: Varsos, D. (2015). An Introduction to Algebraic Theory of Codes [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-928

Abstract

Information Theory and Coding Theory have been deeply intertwined since their origins, marked by Claude Shannon's famous paper "A Mathematical Theory of Communication" in 1948. In contrast, Cryptography, though closely linked to Information and Coding Theories, dates back to ancient times. The distinction among these fields is primarily for technical and educational clarity. This book, intended for both science students and self-learners, focuses exclusively on Algebraic Coding Theory. However, it also aims to illustrate the necessity, power, and elegance of Mathematics. The mathematical prerequisites are modest; a basic understanding of Linear Algebra and Probability, along with some familiarity with polynomials over a field, will suffice as a starting point. Beyond these specific requirements, a general "mathematical maturity" is essential. The material

is initially accessible to readers without advanced mathematical expertise, but it gradually increases in complexity, offering opportunities for deeper exploration. Efforts have been made to structure the sections as independently as possible, allowing flexibility in the order of study, whether in a classroom setting or during self-study. For a detailed overview of each chapter, please refer to the book's table of contents. Each section contains numerous examples and exercises. Throughout the text, you will find prompts like "we can easily see that...," "it is not difficult to prove that...," "the proof is left as an exercise...", along with thought-provoking "why?" questions, encouraging active engagement. At the end of each chapter, a recommended bibliography is provided, encouraging interested readers to delve deeper into the subject matter.



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