20SK – Signals and Codes

Lecture 10 – Binary linear codes

Topics discussed:

- Binary addition and multiplication
- Formal definition of a linear code and a binary linear code
- Hamming weight, minimum weight of a code
- Parity check matrix
- Hamming bound, perfect codes, Hamming codes
- Generator matrix, systematic coding. Parity submatrix.
- Hard-decision decoding of linear codes

The relevant literature is [1, chapters 1 and 2], [2, chapters 5-8] and [3, chapter 3].

Resources

[1] Morelos-Zaragoza, R. H.: *The Art of Error-Correcting Coding*. 2nd edition, John Wiley & Sons, 2006, 263pp.

[2] Adámek, J: *Foundations of Coding: Theory and Applications of Error-Correcting Codes with an Introduction to Cryptography and Information Theory*. Wiley Interscience, 1991, 352 pp.

[3] Moon, T. K.: *Error Correction Coding – Mathematical Methods and Algorithms.* Wiley Interscience, 2005, 756 pp.