

Im Rahmen des Gästeprogramms der Universität findet statt

Intensivvorlesung

CODING THEORY

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Zeitraum: Mai 2013, 6 stündig, mit Übungen (6 ETCS)

Contents:

The present course introduces basic tools used in order to assure the transmission of information on the supports producing errors by noise.

We give basic mathematical concepts which make it possible to construct codes with a given guaranteed speed (information rate). In particular, we treat cyclic codes.

Then we mention some industrial applications concerning the compact disc, and the transmission of images by satellite, . . . (see Chapter XV of [Pa-Wo]).

1. Transmission of information, coding and optimal decoding on a noisy channel. Codes of pure repetition.
2. Distance of Hamming, speed and information rate, relative distance. Hamming bound. Hamming codes.
3. Linear codes and cyclic codes. Generating matrix and computation of the syndrome of errors.
4. Error-locating polynomials. Application to decoding.
5. Reed-Solomon codes and BCH codes. Coding and decoding.
6. Bounds of Plotkin and of Gilbert-Varshamov.
7. Geometric Goppa codes and algebraic curves over finite fields.

At the age of information, an important challenge is to assure the secure travel of the information under good condition, that is to assure that the transportation will not alter the contents of the information.

There exist no perfect transmission channel, that is why one need to protect the information in order that it remains useful after transmission. The tool used for this is the error-correcting codes, the modern theory with modern motivations.

Termine: Die Vorlesung ist für Mi, Do, Fr Nachmittag geplant (ab 2. Mai), (das kann geändert werden).

Vorkenntnisse: Lineare Algebra

Für Interessenten gibt es eine

Vorbereitung: Di, 30. April, 16 Uhr, Zimmer B124 (Prof. Böcherer)

References

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