

# Analysis of Decoding Algorithms for Reed-Muller Codes

## Research Area

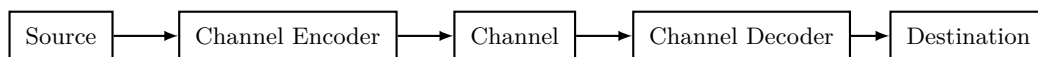
Information theory, coding theory

## Keywords

Channel coding, Reed-Muller codes

## Description

Reed-Muller (RM) codes are among the first linear codes, developed soon after Hamming introduced the concept of error correcting codes. Despite their early discovery, RM codes are powerful codes and they have elegant and desirable properties. Due to their long history, a vast body of literature covering RM codes exists, including many different decoding procedures.



## Goal

The goal of this thesis is to gain a deep understanding of RM codes and the various decoding algorithms. Hence, as a first step, a summary of the current state of the art is the starting point of this thesis. In a second step, one or more decoding algorithms shall be analyzed not only theoretically, but also be implemented and evaluated in simulations.

This thesis provides a great opportunity to gain valuable experience in coding theory, one of the most practical and prestigious fields of information theory. Furthermore, a successful student will obtain a solid basis on which further studies in the field may rest.

Depending on the candidate's interest, the focus of this thesis may be varied between purely theoretical work and a more practical, applied approach to the topic. We offer a friendly work environment as well as intensive support and guidance.

## Prerequisites

- Solid understanding of the principles of information theory and coding, as taught in e.g., *Theoretische Informationstechnik*, *Kommunikationstechnik*, or *Advanced Coding and Modulation*.
- Good command of Python (preferred), C++ or MATLAB

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