

Investigation of Concatenated Coding Schemes for High-throughput Systems

Bachelor's Thesis/Master's Thesis

Project

High-throughput communication and storage systems require extremely low residual error rates while operating under strict constraints on decoding complexity and latency. Code concatenation provides an effective solution by combining multiple coding layers, enabling low-complexity decoding while significantly improving error-rate performance. For example, a concatenated coding scheme could simple inner codes to correct the majority of channel errors, while powerful outer codes suppress the remaining error floor, making them well suited for high-throughput applications.

This thesis aims to investigate the performance of novel concatenated coding schemes and evaluate their suitability for high-throughput systems through theoretical analysis and numerical simulations.

Tasks

1. Study existing concatenated coding architectures and decoding methods
2. Design and analyze novel concatenated coding schemes
3. Evaluate error-rate performance and decoding complexity via simulations

Requirements

- ✓ Basic knowledge of channel coding and error-correcting codes
- ✓ Good programming skills in at least one of the following languages: C/C++, Python, or MATLAB

Institute

Communications
Engineering
Lab

Hertzstr. 16
Gebäude 06.45
76187 Karlsruhe
www.cel.kit.edu

Contact

M.Sc.
Sisi Miao

Room 110
sisi.miao@kit.edu