Karlsruhe Institute of Technology

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High-Girth Spatially-Coupled LDPC Code Design

Master's Thesis

Project

LDPC codes are an important family of channel codes which achieves near-Shannon performance with low complexity BP decoder. Its convolutional counterpart, spatially-coupled (SC) LDPC codes, narrows the gap to the Shannon limit and is further proved to be capacity achieving.
On improving the error floor performance of LDPC codes, one of the most important approach is to remove the short cycles, i.e., increase the girth of the code. Hierachical quasi-cyclic structure is shown to be helpful to efficiently remove the short cycles of LDPC codes, but the already existing girth optimization algorithm is greedy and thus suboptimal. In this thesis we focus on improving the optimization algorithm to find better codes with larger girth.

Tasks

1. Girth optimization of SC-LDPC codes
2. BER performance comparison with benchmark codes

Requirements

- ✔ Interest in coding topics
- ✔ Programming with MATLAB / Python / C / C++

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