Master Thesis

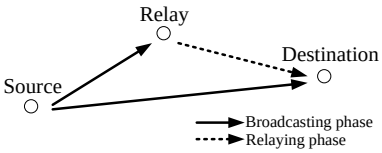
Chair for Theoretical Information Technology | RWTH AACHEN UNIVERSITY

Performance of Relaying with Finite Blocklengths:
DF relaying vs. AF relaying vs. DAF relaying

Research Area
Wireless communication

Keywords
Relaying, finite blocklengths, AF, DF, DAF

Description
Motivated by the increasing demand for higher throughput, broader coverage and higher-level quality of service (QoS), major effort is being made to study the relaying technology in wireless networks. In particular, several cooperative relaying protocols including amplify-and-forward (AF), decode-andforward (DF), DAF (a hybrid relaying protocol combining AF and DF) have been proposed and well-studied. However, most existing research on investigating the relaying performance typically rely on a simplifying assumption of infinite blocklength, which may be inaccurate in realistic wireless systems.



Two-hop relaying.

Recent studies show that in a finite blocklength scenario the shorter the blocklength is the lower the performance is. Considering that two-hop relaying exploits spatial diversity and at the same time it halves the blocklength of the transmission (if equal time division is considered), the relaying performance under the finite blocklength regime becomes interesting. In our recent work, we address in general the analytical performance model for DF relaying with finite blocklengths. However, the performance of AF and DAF relaying protocols and the comparison among AF, DF and DAF protocols are still open problems in the finite blocklength regime.

Goal
Our goal is to develop the performance models of AF and DAF relaying protocols with finite blocklengths and compare the relaying behaviors among AF, DF and DAF protocols in the finite blocklength regime.

Requirements
- Strong interest in theoretical research.
- Background/knowledge in the filed of wireless communications.
- Expertise in mathematics.
- A solid foundation in MATLAB programming.

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Reference
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