RWTH AACHEN UNIVERSITY

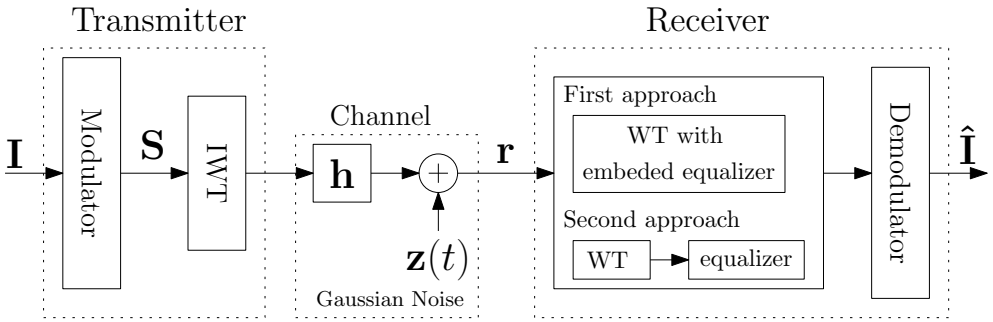
Bachelor/Master Thesis

Effective and Efficient Channel Equalization for the Wavelet-based OFDM System

Research field:
Multicarrier communication systems, digital communications, signal processing

Keywords: Wavelet, OFDM, BER

Discription: The Fast Fourier Transform (FFT) based Orthogonal Frequency Division Multiplexing (OFDM) plays an important role in communication systems since the 1990s. However, with the increase in the number of users and devices, the need for energy efficiency and sophisticated spectrum utilization at low costs drawbacks of the FFT based OFDM become apparent. Consequently, one important, new emerging multi-carrier modulation method is proposed and evaluated recently, which applies a wavelet transform to the system substituting the FFT part of the conventional OFDM, called wavelet-based OFDM (WOFDM). Although WOFDM systems achieve a better performance, the channel equalization, is no longer as simple as the FFT-based OFDM. The system model is shown below.



Goal: The goal of this thesis is to develop an effective and efficient channel equalization method for WOFDM systems under two promising approaches (1. equalization within the wavelet transform, 2. equalization after the wavelet transform, as shown in the figure above). Further more, evaluate and compare it with the traditional techniques under different channels.

Prerequisits:

- Strong interests in theoretical research
- Knowledge of digital communication systems
- Skills in Matlab/Simulink

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