# Bachelor/Master Thesis

## Developing an Evaluation Platform for an OFDM-Based Full-Duplex Transceiver with Erroneous Components using MATLAB

**Research field**

Full-duplex wireless communication

**Keywords**

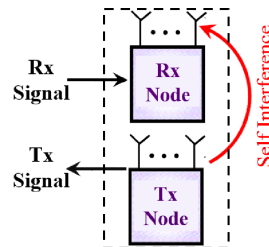Full-Duplex, Self-Interference Cancellation, Test bed

**Description**



Figure 1: Scheme of a full-duplex transceiver with self interference.

A full-duplex (FD) transceiver is characterized by its capability to receive and transmit at the same time and frequency. As a result of this simultaneous operation the inevitable loopback interference signal should be properly estimated and thereby suppressed. While the common approach for modeling the communication systems is focused on the baseband representation of Tx and Rx signals, the challenge of FD transceivers is to estimate and subtract the interference signal in the RF domain. In this respect, the non-linear and imperfect behavior of the involved components such as power amplifier (PA) and low-noise amplifier (LNA) in dealing with high power RF domain signals play an important role in the performance of a FD system. In this project we aim to develop an OFDM-based simulation platform which includes the RF domain description of the signals (after up-conversion), where the effect of imperfect components in RF domain can be simulated. Upon successful performance of the developed platform, the validity of different FD transmit strategies can be evaluated.

**Goal**

- Study the concept of a FD transceiver, necessities and challenges
- Simulate a self-interference cancellation module in a FD transceiver and extend it to P2P communication
- Extend the implemented system to multiple antennas and multiple sub-carriers communication
- Evaluate the available FD transmit strategies on the developed platform and try to achieve better ones

**Requirements**

- Basic knowledge about half-duplex transceiver structures
- Basic knowledge about OFDM systems
- MATLAB programming skills

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