

Research Project

Evaluation and Selection of AD/DA-Converters for Powerline Communication

Description

Digital signal processing is done in the digital domain. But signals and data usually have their origin in the analog domain. The same is with the results of the signal processing application. In the end they need to be available in the analog domain. For that Analog to Digital (ADC) and Digital to Analog Conversion (DAC) is necessary.

In our project we are developing a communication system that will transmit data via Orthogonal Frequency Division Multiplexing (OFDM) over a powerline, which is known as PLC (Powerline Communication). Here the data is transmitted in analog form through the channel. According to the Signal to Noise Ratio (SNR), and the dynamic range (including the effect of Peak to Average Power Ratio (PAPR)), a specific number of bits is necessary. The sampling frequency must be high enough to meet the required needs and the sender and the receiver should be similar.

The task is to do a research on different converters from several manufactures, analyze the conversion technique, sample frequency, complexity and other parameters in regards of the price. After getting an overview the advantages and disadvantages should be discussed, and a proposal of the best choice should be given.



Figure 1: Signal Chain for Communication

The student's work isn't limited to this work but should at least include the following:

- Create an overview of the available AD and DA converters and their technology
- Analysis of the interfaces, number of bits, sampling frequency according to the needs
- Comparison of the different results
- Find the best choice

Recommended experience

- Fundamental knowledge of DA and AD converters
- Basic knowledge of digital signal processing
- Basic understanding of communication systems