Inter Carrier Interference cancellation in MIMO OFDM mobile systems

MIMO OFDM has emerged as the preferred transmission technique for future wireless systems due to the robustness of OFDM against frequency selective fading which is a result of delay spread in the wireless channel and due to the high throughput promised by MIMO systems. Accurate channel estimation plays a key role in the performance of wireless systems based on coherent detection and pilot aided channel estimation (PACE) is a simple and efficient method for channel estimation in MIMO OFDM. Almost all available literature on PACE for OFDM systems consider the channel to be time-invariant during the estimation interval. In practise, mobile wireless channels experience both delay and Doppler spread. In OFDM systems, Doppler spread causes a loss of orthogonality among subcarriers which leads to Inter Carrier Interference (ICI). ICI has a degrading effect on both channel estimation and coherent detection of OFDM symbols. Ignoring the effect of Doppler spread therefore leads to significant performance loss in channels with large delay and Doppler spread. The goal of this internship project will be to investigate and propose new algorithms to mitigate the effects of ICI and thereby improve the performance of for MIMO OFDM receivers that use coherent channel estimation.

Required knowledge and background:

Digital modulation techniques, signal processing, programming skills.

Average score > 28/30.

Internship location: Infineon Technologies France, 2600 Routes des Crêtes, Sophia Antipolis, France

Internship duration: 6 months

Internship grant: To be discussed with Infineon

Contact: Roberto Garello, Politecnico di Torino (garello@polito.it)