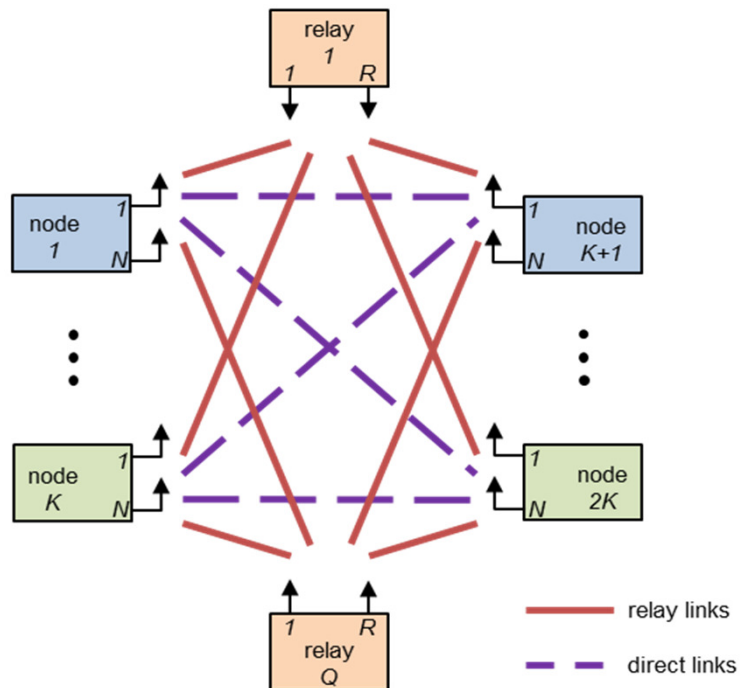


Subject: Interference Alignment with Outdated Channel State Information in Relay Networks

**Research Focus/
 Cross-sectional Area:** R9) Communication systems



Description:

The topic of this thesis is to develop interference alignment schemes with outdated channel state information. Increase in the number of mobile devices and the limited amount of bandwidth available have led to the focus on transmission schemes where multiple transmitters simultaneously utilize the same resource. Interference is a limiting factor in such communication schemes. Recently, interference alignment has been developed as an efficient technique to address interference. Interference alignment requires perfect channel state information at all transmitters and receivers. However in practice, the channel state information obtained through feedback is outdated. Thus, it cannot be used for performing interference alignment. Nevertheless, outdated channel state information will provide the transmitter with the information what the receiver has received during the previous transmission. The focus of this thesis is to develop new interference alignment schemes that take the outdated channel state information into account. Non-linear optimization approaches have to be developed to solve the problem. For further information, cf. also <http://www.kt.tu-darmstadt.de>.

Requirements:

Excellent Diploma or MSc in EE & IT or related area; excellent background in communications engineering, signal processing and mathematics; excellent background in programming and simulation in Matlab, C++; good knowledge of German and English languages

Supervisors: A. Klein, Communications Engineering,
 S. Ulbrich, Nonlinear Optimization and Optimal Control.