PhD Oral Defense

Date: **17 August 2020 (Monday)**   **Time:**   **10:00am**

Thesis Title

Precoder Design for MIMO Systems with User Cooperation and Non-Orthogonal Multiple Access

Mr ZHANG Rongbin (Supervisor: Dr S H Leung)

Abstract

The ever-increasing demand of different quality of service (QoS) requirements has been calling for new techniques to support massive connectivity in wireless communications.

This thesis focuses on transmit-receive strategies and precoder designs in the uplink of multiple-input multiple-output (MIMO) networks where user cooperation and non-orthogonal multiple access (NOMA) protocol are studied.

In the first study, idle users act as relay nodes to help an active user with poor channel gain to transmit to the base station (BS). An efficient robust design of the source and relay precoders based on statistical channel state information (CSI) of a generic two-hop amplify-and-forward MIMO multiple-relay network with the source-to-destination direct link for a general formulation is developed.

In the second study, multiple active users transmit data simultaneously. A novel MIMO-NOMA scheme with multi-group detection is proposed. In the scheme, users are divided into groups for detection at the BS. The inter- and intra-group interferences are handled by successive interference cancellation (SIC) and transceivers, respectively. The study consists of two parts. In Part 1, user precoders are designed under perfect SIC condition. In Part 2, the design is extended to imperfect SIC by explicitly addressing the impact of practical SIC residuals in the precoder design.