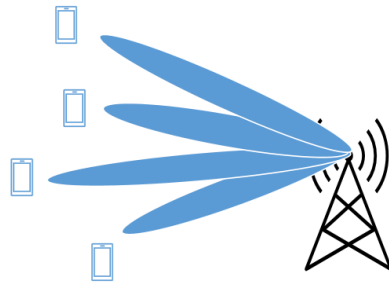


Resource allocation: how to focus wideband beams to make everyone happy?

Bachelor Thesis Assignment / Student Assignment



Theme:	Resource allocation
Application:	5G, IoT, or vehicular communications
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I. Introduction:

Summary: In beyond 5G radio networks, distributed array antennas can be used to serve different users in a coherent manner. To make everyone happy, we have to steer beams and allocate certain bandwidth to specific users to satisfy the data rate requirements. Different users could experience varying frequency-selective channel conditions. There exists challenges such as subcarrier allocation along with beam focusing and power allocation.

Problem definition: This thesis focuses on addressing these challenges by formulating and solving optimization problems, providing practical solutions for applications like 5G, IoT, or vehicular communications.

II. Description

Method:

The project will involve following steps:

1. System modelling: model the system mathematically.
2. Problem formulation: define optimization problems, performance metric, objective functions and constraints.
3. Solve the formulated problem: deterministic methods (linear programming, semi-definite relaxation...) or stochastic methods (genetic algorithm, particle swarm...)
4. Performance analysis: Evaluate the obtained solution, state strengths and limitations of the proposed approach.

III. Requirement courses, skills and supervision:

You are familiar with MATLAB. You have a background in Electrical Engineering or Computer Science, have knowledge in wireless communication, optimization, or willing to learn related skills.

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