Radio Resource Allocation for Multicast Transmissions over High Altitude Platforms

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In our research, we study radio resource allocation (RRA) for multicasting in OFDMA based High Altitude Platforms (HAPs). We formulate an optimization problem for a scenario in which different sessions are multicasted to user terminals (UTs) across HAP service area. We then solve it to find the best allocation of HAP resources such as radio power, sub-channels, and time slots. The objective is to maximize the number of UTs that receive the requested multicast streams in the HAP service area in a given OFDMA frame. The optimization problem comes out to be a Mixed Integer Non-Linear Program (MINLP). Due to the high complexity of the problem and lack of special structures, we believe that breaking it into two easier subproblems and iterating between them to achieve convergence can lead to an acceptable solution. Subproblem 1 turns out to be a Binary Integer Linear Program (BILP) of no explicitly noticeable structure and therefore Lagrangian relaxation is used to dualize some constraints to get a BILP with some special structure that is easy to solve. The subgradient method is used to solve for the dual variables in the dual problem for three proposed methods to get the tightest bound in each. The obtained bounds can be used in a branch and bound (BnB) algorithm as its bounding subroutine at each node. Subproblem 2 turns out to be a simple linear program (LP) for which the simplex algorithm can be used to solve the subproblem to optimality. We focus here on subproblem 1 and its proposed solution techniques.
INSTRUCTIONS

Here are instructions for the GradCon 2012 template (see previous)

Bookman Old Style -- 20 pts
Color: R=148, G=54, B=52
Paragraph: Left Justified

Mangal – 8 pts
(any sans-serif is OK)
Paragraph: Right Justified

Times – 14pts
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Paragraph – Centered

Times – 11 or 12pts
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Times – 11 or 12pts
Times – 9, 10, or 11 pts
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Times – 9 pts
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