Joint Power Allocation and Network Slicing In an End to End O-RAN System

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Abstract—
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I. Introduction

This document is a model and instructions for LaTeX. Please observe the conference page limits.

II. System Model and Problem Formulation

In this section, first, we present the downlink (DL) of O-RAN System. Then we obtain achievable rate and delays. Afterward, the main problem is expressed.

A. System Model

Suppose that there are S Slices Serving V Services. Each Service $v \in \{1, 2, ..., V\}$, consists of U_v single antenna users that require certain service. Each slice $s \in \{1, 2, ..., S\}$ consists of R_s RRHs and N_s PRBs. Each RRH $r \in \{1, 2, ..., R\}$ is connected to BBU pool via an optical fiber link with limited fronthaul capacity. Also each RRH and PRB can serve more than one slice. It is considered that in BBU, the system has 2 processing layer consists of M_1 homogeneous VMs in first layer and M_2 homogeneous VMs in second layer.

B. Achievable Rate

In this subsection, the Achievable Rate is obtained as below. The achievable data rate for i^{th} UE in v^{th} service can be written as

$$R_{u(v,i)} = B \log_2(1 + \rho_{u(v,i)}) \tag{1}$$

where $\rho_{u(v,i)}$ is obtained from

$$\rho_{u(v,i)} = \frac{P_{u(v,i)}}{BN_0 + I_{u(v,i)}} \tag{2}$$

References

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