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Channel estimates of the speed available to users on OFDM-MIMO systems

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Abstract

In this paper, a Massive MIMO system consists of a base station (BS) and several users. In this system, users send their information in a frequency-time source. For simplicity and cheapness, devices are single-antenna users. BS uses MRC, ZF and MMSE to detect user information. These receivers are relatively close to optimal performance due to the large number of BS antennas. BS needs to be aware of channel conditions to reveal users' information. Under these conditions, we first calculate the speed of each user by assuming accurate channel information in the BS, then we can examine the available speed in real conditions and by estimating the channel. To estimate the channel, we use orthogonal triangles with a minimum length of time equal to the number of users, and we show that by increasing the number of antennas in the BS, we can eliminate the effect of the channel estimation and reach the desired speeds. In the last section we present the simulation results and compare the two states.

Key words: Massive MIMO, Acceptable Speed, Channel Estimation

1. Introduction

In recent years, the volume of multimedia data transmitted by wireless systems has expanded exponentially (Mimos, Yang, & Hanzo, 2015). Therefore, simultaneous increase of data transmission and reliability of telecommunication systems has been considered as one of the most important challenges faced by researchers. One of the techniques widely used to reach the high transmission rates and reliability of telecommunication networks is the Multi-Input Multi-Input Systems (MIMO), defined as a communication system with multiple antennas in the transmitter and receiver (Duman & Ghrayeb, 2007), (Alamouti, 1998). Today, MIMO systems in digital communications are among the most influential techniques in modern communications such as IEEE 802.16 WiMax, IEEE 802.11WiFi and third-generation cellular systems (Metropolitan, Networks, & Networks, 2014) [2]. Multi-user MIMO systems (MU-MIMO) are designed to allow multiple users to