Abstract

A MIMO system can offer two types of gains i.e. spatial multiplexing (increase data rate) and diversity gain. However, these benefits of MIMO systems depend crucially on the kind of fading the channels undergo and whether the channel state information (CSI) is known at the transmitter. Most of the researches have been on Rayleigh channels. However in real world
propagation environment, the fades are not independent, for instance due to insufficient spacing between antenna elements or due to lack of scatterers. It is possible that the line of sight component (LOS) may exist in addition to scattered components. Then the fading will follow the Rician distribution. This paper envisages the capacity benefits of MIMO under a slow changing and correlated Rician fading environment for the LTE downlink 2x2 configuration. The effect of no of multipath on capacity is also investigated. Here 2 Omni directional transmit antennas at the base station and 2 similar receive antennas at the terminal side are taken. In Long Term Evolution (LTE), MIMO technologies have been broadly used to get better downlink peak rate, cell coverage, as well as average cell throughput. To achieve this goals, LTE adopts two major MIMO technologies i.e. Spatial multiplexing (SM) and transmit diversity (TD). Spatial multiplexing allows transmitting different streams of data simultaneously on the same downlink resource block(s) this increases the data rate of the user. In Transmit Diversity a single stream of data is assigned to the different layers and coded using space frequency block coding (SFBC). SFBC achieves robustness through frequency diversity by using different subcarriers for the repeated data on each antenna. This paper will show the effect of strongest multipath component i.e. Recian factor on capacity and diversity. These all finding will pave the path for comparison between the often studied Rayleigh environment (Non LOS) and the Rician environment (LOS).

Reference

- Effect of Antenna Correlation and Rician Fading on Capacity and Diversity of Wireless MIMO Channels Syed M. Tabish Qaseem, and Adel A. Ali
Throughput Quantification of MIMO based Correlated Rician fading Channel for a LTE downlink system

- Mohinder Jankiraman: Space-Time Codes and MIMO Systems, Artech House, Chapter 2 (2.2.3 & 2.2.5).
- Space Diversity in Presence of Discrete Multipath Fading Channel Carmela Cozzo, Member, IEEE, and Brian L. Hughes, Member, IEEE

Index Terms

Computer Science
Information Technology

Key words

Spatial Multiplexing
Transmit Diversity

Space-Time Codes

Alamouti Code

LTE

Channel State Information