

Abstract

Moustafa Hussein Aly

Time Coding OTDM MIMO System Based on Singular Value Decomposition for 5G Applications

For 5G and beyond cellular communication systems, new coding and modulation techniques are suggested to reach the requirements of high data rate and quality of service. In this paper, a new space-time coded orthogonal transform division multiplexing (STC OTDM) technique is proposed for 5G applications. The proposed system is used to enhance the data rate and performance of the orthogonal transform division multiplexing (OTDM) technique. The proposed system is based on using space-time coding (STC) with OTDM to increase the system diversity and consequently the system performance. The OTDM technique is based on transmitting data on orthogonal basis functions obtained from the Singular Value Decomposition (SVD) of the channel impulse response of the desired user. Various modulation techniques like QPSK, 64-QAM, and 256-QAM are investigated using different subcarriers and channel models. The simulation results show that the proposed system achieved a better performance when compared to classical and recent multicarrier techniques. The proposed technique increases the diversity gain resulting in a decrease in the fading effect of the multipath channel and an enhancement in the bit error rate (BER) performance. The proposed technique also provides a secure data transmission to the desired user as his data is sent on the basis functions extracted from his own channel impulse response that cannot be decoded by other users.