

## Implementation of Successive Interference Cancellation Algorithms in the 5g Downlink

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**Abstract :** In this paper, we have implemented successive interference cancellation algorithms in the 5G downlink. We have calculated the maximum throughput in Frequency Division Duplex (FDD) mode in the downlink, where we have obtained a value equal to 836932 b/ms. The transmitter is of type Multiple Input Multiple Output (MIMO) with eight transmitting and receiving antennas. Each antenna among eight transmits simultaneously a data rate of 104616 b/ms that contains the binary messages of the three users; in this case, the Cyclic Redundancy Check CRC is negligible, and the MIMO category is the spatial diversity. The technology used for this is called Non-Orthogonal Multiple Access (NOMA) with a Quadrature Phase Shift Keying (QPSK) modulation. The transmission is done in a Rayleigh fading channel with the presence of obstacles. The MIMO Successive Interference Cancellation (SIC) receiver with two transmitting and receiving antennas recovers its binary message without errors for certain values of transmission power such as 50 dBm, with 0.054485% errors when the transmitted power is 20dBm and with 0.00286763% errors for a transmitted power of 32 dBm(in the case of user 1) as well as with 0.0114705% errors when the transmitted power is 20 dBm also with 0.00286763% errors for a power of 24 dBm(in the case of user2) by applying the steps involved in SIC.

**Keywords :** 5G, NOMA, QPSK, TBS, LDPC, SIC, capacity

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