

Performance of SC-FDMA System with STBC Encoding and TPTS Technique through Rayleigh Fading Channel using BFPFO Algorithm

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Abstract – Single Carrier- Frequency Division Multiple Access (SC-FDMA) is one of the multiple-access techniques for cellular systems especially when the continuous transmission is required such as in voice or image. It is more efficient than OFDMA. Because of its lower peak-to-average power ratio (PAPR) of SC-FDMA as compared to OFDMA, it is being used in the communication channels. Space-time block codes (STBC) is a coding schemes used to reduce the fading effects in multipath and to increase the strength of the transmitted signal. In this work, an STBC encoded SC-FDMA system is analyzed under Rayleigh fading channel. This work deals with the PAPR and BER reduction in SC-FDMA with STBC 2×1 encoder using a Time-domain Partial Transmit Sequence (TPTS) technique. Bacterial Foraging Phase Factor Optimization (BFPFO) algorithm is used to select the best phase factor for minimum PAPR. This paper also compares various PAPR reduction techniques for SC-FDMA system for PAPR and BER. The results of the original SC-FDMA and STBC encoded SC-FDMA are compared for PAPR and BER.

Keywords – Single Carrier-Frequency Division Multiple Access (SC-FDMA), Orthogonal Frequency Division Multiple Access (OFDMA), Partial Transmit Sequence (PTS), Rayleigh Fading channel, Bacterial Foraging Phase Factor Optimization Algorithm (BFPFO).