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PAPR reduction using artificial bee colony algorithm in OFDM systems

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Abstract: Partial transmit sequence (PTS) is an attractive scheme for peak-to-average power ratio (PAPR) reduction in orthogonal frequency division multiplexing (OFDM) systems, but its high computational complexity to find optimum phase factors is the main drawback. In this paper, we propose PTS based on an artificial bee colony (ABC) algorithm (ABC-PTS) for reducing the computational complexity of the PTS in the OFDM system. The ABC-PTS was compared to conventional PTS using a random search strategy (RS-PTS) and optimum PTS. In addition, the bit error rate (BER) performance of the ABC-PTS was shown when a high power amplifier (HPA) was used for additive white Gaussian noise (AWGN) and Rayleigh flat fading channel models. Solid state power amplifiers (SSPA) and traveling wave tube amplifiers (TWTA) are commonly used HPA models, and simulations were realized for both of these HPA models. Simulation results showed that the ABC-PTS is highly successful in reducing the computational complexity of the conventional PTS and BER performances in the OFDM system.

Key Words: Orthogonal frequency division multiplexing (OFDM), peak-to-average power ratio (PAPR), partial transmit sequences (PTS), artificial bee colony (ABC), high power amplifier (HPA)

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