Genetic Algorithm for PAPR Reduction in SLM Wavelet-OFDM Systems

Mohamed S. El-Mahallawy
Department of Electronics and Communications Engineering
College of Engineering and Technology, Arab Academy for Science, Technology & Maritime
Transport Cairo, Egypt
mahallawy@aast.edu

Technical Research Center
Cairo, Egypt
esamhagras_2006@yahoo.com

Esam A. A. Hagras
Department of Electronics and Electrical Communications

Abstract—Orthogonal frequency division multiplexing (OFDM) has lately used in wireless communication systems for its high transmission data rate and robustness against frequency selective fading. However, OFDM system suffers from a major drawback at the transmitter that is the high peak-to-average power ratio (PAPR) of the transmitted OFDM signal. Selected mapping (SLM) technique is used to achieve a good PAPR reduction without signal distortion. In this paper, an efficient PAPR reduction technique using SLM Wavelet-OFDM (WOFDM) based on Genetic Algorithm (GA) is proposed. Wavelet-OFDM (WOFDM) system has the same advantages of conventional OFDM with high PAPR reduction. GA is applied to SLM-WOFDM for searching the optimum phase rotation factors to give more reduction in PAPR. The simulation results show that the proposed system provides better PAPR reduction compared to the conventional SLM-OFDM and SLM-WOFDM systems.

Keywords—*Selected mapping (SLM), discrete wavelet transform (DWT), genetic algorithm (GA), peak-to-average power ratio (PAPR).*