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PAPR Reduction Using Hybrid PS-GW Optimization

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Abstract
OFDM has changed the way bandwidth was utilized in communication, this paper explains fundamentals of OFDM and its Multiband implementation in Ultra Wideband Technology. The most famous and attractive strategy used in wireless communication for huge transmission of data with higher rate was orthogonal frequency division multiplexing (OFDM) approach and for transmission of higher bandwidth range UWB approach is used. Major problem identified in OFDM and UWB-OFDM systems is high PAPR. The reduction of PAPR in OFDM system has been carried out with one of the most familiar approach called Partial transmit sequences (PTS). Various techniques are already presented for reducing the PAPR, some of them are, clipping, SLM, and PTS. From that PTS is considered as an efficient method because the PAPR was reduced by PTS without causing any signal distortion. In this work, PTS along with hybridization optimization algorithm named as PS–GW will be implemented to get the minimum performance on PAPR and computational complexity. The PS–GW is a combination of both the Particle Swarm Optimization (PSO) and Grey Wolf Optimizer (GWO) which search the optimal combination of phase rotational factors efficiently. A fundamental thought in this method was that the capacity of exploitation in PSO was enhanced with the capacity of investigation in GWO to create a two variations in quality. The results produced by this proposed method shows that the reduction was effectively determined in both PAPR and computational complexity. The same technique is applied to multiband OFDM ultra wide band signals and PAPR is observed.

Keywords OFDM, UWB, PTS, PSO, GWO, PAPR

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Introduction

Wireless communication is the transfer of information over a distance without the use of electrical conductors or "wires". The distances involved may be short (a few meters as in television remote control) or long (thousands or millions of kilometers for radio communications). Wireless communication is generally considered to be a branch of telecommunications. It encompasses various types of fixed, mobile, and portable two way radios, cellular telephones, personal digital assistants (PDAs), and wireless networking.

Other examples of wireless technology include GPS units, garage door openers and or garage doors, wireless computer mice, keyboards and headsets, satellite television and cordless telephones . Wireless operations permits services, such as long range communications, that are impossible or impractical to implement with the use of wires. The term is commonly used in the telecommunications industry to refer to telecommunications systems (e.g. radio transmitters and receivers, remote controls, computer networks, network terminals, etc.) which use some form of energy (e.g. radio frequency (RF), infrared light, laser light, visible light, acoustic energy, etc.) to transfer information without the use of wires. Information is transferred in this manner over both short and long distances.

In 1895, Guglielmo Marconi opened the way for modern wireless communications by transmitting the three dot Morse code for the letter 'S' over a distance of three kilometers using electromagnetic waves. From this beginning, wireless communications has developed into a key element of modern society. From satellite transmission, radio and television broadcasting to the now ubiquitous mobile telephone, wireless communications has revolutionized the way societies function. Wireless communications and the economic goods and services that utilise it have some special characteristics that have motivated specialised studies. First, wireless communications relies on a scarce resource – namely, radio spectrum. Second, use of spectrum for wireless communications required the development of key complementary technologies; especially those that allowed higher frequencies to be utilised more efficiently. Finally, because of its special nature, the efficient