

A Dual-Function OFDM Waveform Design for Future Multicarrier Communication

Yiqian Huang,

Ping Yang,

Zammit S.,

Ning Yang,

Gang Wu,

Mordachev V.¹

2024

¹Belarusian State University of Informatics and Radioelectronics, 6 P. Brovki Street, Minsk 220013 Belarus

Keywords: IM, MDS coded modulation, OFDM, PAPR reduction, side information free, SLM.

Abstract: This letter proposes a novel orthogonal frequency division multiplexing (OFDM) waveform termed MDS-OFDMIM, in which the subcarriers are divided into two distinct groups with specific functions: peak-to-average power ratio (PAPR) reduction and error detection. The PAPR reduction subcarriers employ a selective mapping (SLM) scheme without side information, while the error detection subcarriers are modulated by a simple maximum distance separable (MDS) coded modulation scheme. In our design, the index modulation (IM) concept is exploited to the locations of PAPR reduction subcarriers for carrying extra information. Moreover, a novel power allocation strategy between the aforementioned two groups is proposed to balance system error and PAPR performances, which is formulated as an optimization problem

and solved by a searchbased method. Numerical results demonstrate the superiority of MDS-OFDM-IM over conventional OFDM and OFDM-IM in both error and PAPR performances.

Publication source: A Dual-Function OFDM Waveform Design for Future Multicarrier Communication / Yiqian Huang, Ping Yang, S. Zammit [et al.] // IEEE Communications Letters. – 2024. – Vol. 28, № 7. – P. 1624–1628.