

Orthogonal frequency division multiplexing with index modulation (OFDM-IM) is a recently developed transmission technique that extends the principle of spatial modulation to OFDM subcarriers. In this paper, the performance of OFDM-IM is studied in terms of the achievable rate assuming an M-ary constellation and that channel state information is available at the receiver. A closed-form lower bound is derived, based on which an interleaved grouping method is proposed for the use of subcarriers. In comparison with the existing grouping method, the proposed one can better benefit from the diversity effects over frequency-selective fading channels, especially when the spacing of any two subcarriers within a subcarrier group is larger than the coherence bandwidth. Through numerical results, it is revealed that OFDM-IM with interleaved grouping outperforms classical OFDM for small M and certain ranges of signal-to-noise ratio. Finally, the effects of modulation types on the performance of OFDM-IM are studied. It is found that the superiority of OFDM-IM over classical OFDM is greater for phase-shift keying than for quadrature amplitude modulation.