

## **A multilayers adaptive ALACO-OFDM for spectral efficiency improvement using PSO algorithm in visible light communication systems**

### **Abstract**

In this paper, we propose a new adaptive layered asymmetrically-clipped optical orthogonal frequency division multiplexing (ALACO-OFDM) technique as a method to improve the spectral efficiency of optical system, especially visible light communication (VLC). Particle swarm optimisation (PSO)-based LACO-OFDM method is used for this purpose and the channel capacities are studied. Simulations using variable layers are carried out to validate the theoretical steps. The simulation results indicate that the ALACO-OFDM technique has significantly improve the spectral efficiency compared to previous techniques such as ACO-OFDM. Moreover, it is shown that channel capacities of different layers are significantly improved when electrical power is increased. © 2023 Walter de Gruyter GmbH. All rights reserved.

### **Keywords**

ALACO-OFDM; LACO-OFDM; OFDM; PSO; VLC