An introduction to orthogonal frequency-division multiplexing

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Abstract

This report is an introduction to *orthogonal frequency-division multiplexing* (OFDM). The focus is on signal processing areas pursued by our research group at Luleå University of Technology. We present an historical background and some frequently used system models. Typical areas of applications are also described, both wireless and wired. In addition to the general overview, the addressed areas include synchronization, channel estimation and channel coding. Both time and frequency synchronization are described, and the effects of synchronization errors are presented. Different types of channel estimators are described, where the focus is on low-complexity algorithms, and in this context, advantages and disadvantages of coherent and differential modulation are also discussed. Channel coding is described, both for wireless and wired systems, and pointers are included to evaluation tools and bitloading algorithms. An extensive bibliography is also included.

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