Abstract

The 3rd generation partnership project (3GPP) long term evolution (LTE) standard uses single carrier frequency division multiple access (SCFDMA), scheme for the uplink transmissions and orthogonal frequency division multiple access (OFDMA) in downlink. SCFDMA makes use of single carrier modulation and frequency domain equalization, it is a technique that has similar performance and essentially the same overall complexity as those of OFDM, But in OFDMA high peak-to-average power ratio (PAPR) is a major drawback. An outstanding advantage of SC-FDMA is its lower PAPR due to its single carrier structure. In this paper, we analyze the PAPR of SC-FDMA signals with pulse shaping. We analytically derive the time domain SC-FDMA signals and numerically compare PAPR characteristics using the complementary cumulative distribution function (CCDF) of PAPR. The results show that SC-FDMA signals indeed have lower PAPR compared to those of OFDMA. Comparing the two forms of SC-FDMA, we find that localized FDMA (LFDMA) has higher PAPR than interleaved FDMA (IFDMA) but somewhat lower PAPR than OFDMA. Also noticeable is the fact that pulse shaping increases PAPR. To reduce the PAPR, we propose an efficient Kalman filter based PAPR reduction algorithm.
References

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SC-FDMA based systems to Reduce PAPR by using a Modified Companding Scheme


Index Terms

Computer Science  Signal Processing

Keywords
OFDMA  SC-FDMA  IFDMA  LFDMA  PAPR  Kalman Filter