



A novel Technique for Linearizing Digital Pre-distortion in Power Amplifiers for OFDM Applications

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ABSTRACT

In this paper, a novel technique is proposed for linearizing digital pre-distortion in power amplifiers for OFDM systems. For this purpose, a hybrid technique comprising search table method and polynomial method is employed such that as few as hardware are utilize in implementation in order to not only decreases computational complexity but also leads to a fast response capability. Furthermore, least mean square (LMS), as a competitive method, was employed in the proposed technique. Coefficients of look-up table are estimated by LMS method as a forward program with the least error amount in order to estimate modulator output of OFDM. In addition, designing of several RF power amplifiers and their linearization unit in ADS software results in elimination of non-linear distortions of these amplifiers by linearizing unit, and yet various realistic involved phenomena in base-band pre-distortion system design, including memory effect, antenna mismatch, and etc., are studied. Measures such as ACPR were adopted for the purpose of linearization measurement and comparison. High The peak-to-average power ratio (PAPR) is one of the biggest problems in OFDM systems that by combining these techniques, we improve it. The obtained results of the proposed technique are presented both by look-up table and frequency spectrum of output signal. The results also indicate appropriate performance of the proposed technique. Simulations were carried out on ADS software, while final signal output was extracted by MATLAB.

Keyword:

Digital Pre-distortion,
Power amplifier,
Linearization, OFDM,
Look-up table method,
Polynomial method

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