

Adaptive Polynomials Method for FBMC Nonlinear Power Amplifier Complex Gain

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Abstract— In this paper, an adaptive polynomials for nonlinear power amplifier complex gain of a filter bank multicarrier modulation (FBMC) is modelled. One of the main problems in FBMC systems is the high peak-to-average power ratio (PAPR) of transmitting signals which leads to a significant distortion when passed through a nonlinear device such as a high power amplifier (HPA) of transmitter. Therefore, analytical expression of HPA characteristic based on an orthogonal polynomial method is investigated. From the simulation result, the HPA modelling error of the orthogonal polynomial method is better than that of the conventional polynomial method at a high input value. As a result, a combination of the orthogonal polynomial method and the conventional polynomial method, called the adaptive polynomial method, is proposed. With this method, the orthogonal polynomial method is applied for a high input value and adopts the conventional polynomial method for a low input value. A comparison with the simulation results is carried out to verify the accuracy of this method.

Keywords— power amplifier, orthogonal polynomial, nonlinear system, memoryless HPA, FBMC



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