

OFDM系统的神经网络功放预失真

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摘要 针对非线性高功率放大器导致正交频分多址系统传输性能下降问题, 采用两个类似结构的单输入单输出反向传播神经网络串联后级联高功率放大器实现其预失真. 前一网络是基于改进的非直接学习方法训练得到的高功率放大器的幅度预失真器, 克服了非直接学习的缺陷; 后一网络是高功率放大器的相位特性模型, 回避了逆向模型的弊端. 仿真结果显示了在输入回退低至2.93dB时, 该方法仍能使高功率放大器输出信号的带外谱扩散降低约15dB, 而其他方法此时不能起任何作用, 且前者网络规模小于后者, 表明了该方法结构简单, 能够更加高效地实现正交频分多址系统中非线性高功率放大器的自适应预失真.

关键词 [正交频分多址](#) [高功率放大器](#) [反向传播神经网络](#) [预失真](#)

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NN predistorter for the non-linear HPA in the OFDM system

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Abstract

To circumvent the transmission performance degradation of the orthogonal frequency division multiplexing (OFDM) systems due to the nonlinear high power amplifiers (HPA), a new predistorter is presented which consists of two similar single-input and single-output BP neural networks (NN) in series. The former NN is the amplitude predistorter obtained by the improved indirect learning method which overcomes the shortcoming of the indirect method, and its phase predistortion based on the latter NN is implemented by the phase characteristic model rather than its inverse model. Simulation results show that the proposed predistorter can make about 15dB reduction of out-of-band spectral regrowth with fewer neurons even at 2.93dB IBO (input back-off) where another available can not work any longer, indicating this adaptive predistorter with a simpler structure outperforms other predistorters for the HPA employed in the OFDM systems.

Key words [orthogonal frequency division multiplexing](#) [high power amplifiers](#) [BP neural network](#) [predistortion](#)

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