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Power amplifier linearization in wireless communication systems

Maximize Power Efficiency, System Cost Reduction, Prolong Battery Life



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Power Amplifiers (PAs) are one of the key elements in communication systems and they are nonlinear in a certain operation region. The nonlinearity generates spectral regrowth, which leads to Adjacent Channel Interference (ACI) and violations of the out of band emission. To reduce the nonlinearity, the power amplifier can be backed off to operate within the linear portion of its operating curve. However, transmission formats such as Wideband Code Division Multiple Access (WCDMA) and Orthogonal Frequency Division Multiplexing (OFDM), have high Peak to Average Power Ratios (PAPR), it means the large fluctuations in their signal envelopes. This means that the power amplifier needs to be backed off far from its saturation point, which results in very low efficiencies, typically less than 10%, more than 90% of the dc power is lost and turns into heat. By increasing the number of the base stations and then the number of power amplifiers, improvement in efficiency of the power amplifier reduce the cost of the system. To enhance the power amplifier efficiency without compromising its linearity, power amplifier linearization is essential.

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