

Large-Signal Analysis Of Class A Vacuum Triode Push-Pull

Output Stage

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Summary

A mathematical model for the input-output characteristic of a class A push-pull output stage using triode vacuum tube amplifiers is presented. The model, basically a sine series function, can easily yield closed-form series expressions for the amplitudes of the output components resulting from multisinusoidal input signals to the output stage. The special case of an equal-amplitude two-tone input signal is considered in detail. The results show that, similar to a transistor-based class A output stage, the vacuum triode class A output stage generates only odd-order harmonic and intermodulation components. The results also show that the amplitudes of these components are strongly dependent on the amount of cathode feedback and the amplitudes of the input tones. For sufficiently small input tone amplitudes, the relative harmonic and intermodulation products are too small and their magnitudes are within or close to the error range of the Fourier series approximation. However, for relatively large input tone amplitudes the relative harmonic and intermodulation components are increasing monotonically with the input tone amplitudes.

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