

An Analytical Method for Analysing Large-Signal Distortion

Peter S. Blockley

Department of Electronics, Macquarie University, Sydney Australia 2109

Email: pblockle@ics.mq.edu.au

Abstract

Large-signal distortion is typically modelled with large-signal models or with describing functions. While these methods can provide an accurate prediction of system distortion, they do not provide analytic equations showing the effect on distortion as the signal traverses different regions of the load line.

The Volterra series has been successfully used in weakly nonlinear systems to analytically investigate nonlinear distortion. The Volterra series is limited to mildly distorting systems due to the finite radius of convergence of the polynomials used to describe the nonlinearity. A method to extend the Volterra series technique for large-signal operation has been investigated. This enables better understanding of the individual contributions different regions of the load line make to the overall distortion characteristic.