Miller Theorem for Weakly Nonlinear Feedback Circuits and Application to CE Amplifier

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Abstract: The paper presents the derivation of Miller formulas for weakly nonlinear feedback networks. The expressions found are simple and compact and constitute a generalization of the well known linear case. As an application example, the formulas are applied to a common-emitter amplifier to straightforwardly derive the closed-form expressions of second- and third-harmonic distortion factors. The results found, validated by Spectre simulations with a VBIC bipolar model, allow to understand in depth the contribution of each nonlinear element.

Opinion: The applications of Miller formulas are quite important in the DSP world. As the abstract mentioned, harmonic filtering plays an important role in engineering as a whole. Though papers, such as these, might not seem to make a very large impact on the engineering society right now they can, potentially in the future. Theoretical computations in engineering can be one thing but the proper application of it can lead to immeasurable results. Therefore, we must treat each and every theory (and IEEE paper in this case) with the utmost value because they can potentially hold the key for many future technologies that will come to develop over time.