Abstracts

Noise and Loss in Balanced and Subharmonically Pumped Mixers: Part I--Theory

A.R. Kerr. "Noise and Loss in Balanced and Subharmonically Pumped Mixers: Part I--Theory." 1979 Transactions on Microwave Theory and Techniques 27.12 (Dec. 1979 [T-MTT] (1979 Symposium Issue)): 938-943.

In this paper, the theory of noise and frequency conversion is developed for two-diode balanced and subharmonically pumped mixers. Expressions for the conversion loss, noise temperature, and input and output impedances are derived in a form suitable for numerical analysis. Schottky diodes are assumed, having nonlinear capacitance, series resistance (which may be frequency dependent due to skin effect), and shot and thermal noise. In Part II, the theory is applied to several practical examples, and computed results are given which show the very different effects of the loop inductance (between the diodes) in balanced and subharmonically pumped mixers. It is also shown that the ideal two-diode mixer using exponential diodes has a multiport noise-equivalent network (attenuator) similar to that of the ideal single-diode mixer.

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