Abstracts

Shot-Noise in Resistive-Diode Mixers and the Attenuator Noise Model

A.R. Kerr. "Shot-Noise in Resistive-Diode Mixers and the Attenuator Noise Model." 1979 Transactions on Microwave Theory and Techniques 27.2 (Feb. 1979 [T-MTT]): 135-140.

The representation of a pumped exponential diode, operating as a mixer, by an equivalent lossy network, is reexamined. It is shown that the model is correct provided the network has ports for all sideband frequencies at which (real) power flow can occur between the diode and its embedding. The temperature of the equivalent network is eta/2 times the physical temperature of the diode. The model is valid only if the series resistance and nonlinear capacitance of the diode are negligible. Expressions are derived for the input and output noise temperature and the noise-temperature ratio of ideal mixers. Some common beliefs concerning noise-figure and noise-temperature ratio are shown to be incorrect.

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