Abstracts

Noise and Loss in Balanced and Subharmonically Pumped Mixers: Part II--Application

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The theory presented in Part I is applied here to some simple two-diode subharmonically pumped and balanced mixers. It is shown that the magnitude of the loop inductance (seen by currents circulating through the two diodes) affects the subharmonically pumped mixer much more strongly than the balanced mixer. The theory is also applied to the ideal two-diode mixer (balanced or subharmonically pumped) using exponential diodes with no series resistance and no nonlinear capacitance. It is shown that, like its single-diode counterpart, this mixer has a noise-equivalent lossy network whose physical temperature is eta T/2, where eta is the ideality factor of the exponential diodes. It follows that the ideal subharmonically pumped resistive mixer is not intrinsically less noisy than the ideal resistive fundamental mixer. This is not necessarily the case if parametric effects, due to nonlinear diode capacitance, are present.

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