Abstracts

Conversion Matrix and Gain of Self-Oscillating Mixers

M. Claassen and U. Guttich. "Conversion Matrix and Gain of Self-Oscillating Mixers." 1991 Transactions on Microwave Theory and Techniques 39.1 (Jan. 1991 [T-MTT]): 25-30.

The conversion matrix of self-oscillating mixers is derived from the bias, amplitude, and frequency-dependent admittance of the active. device together with its dynamic current-voltage characteristic. Components at the image frequency are also taken into account. With this matrix and the circuit admittances at the different frequencies involved, the conversion gain can be expressed. For better insight into the relevant mechanisms, the conversion gain is subdivided into the amplitude response of the self-excited oscillation to an input signal and the demodulation caused by the device internal rectification. The formalism is applied to a simplified model of an oscillating BARITT diode. The resulting analytical expressions allow a discussion of the influence of different device and circuit parameters as well as a qualitative and quantitative comparison with experimental results from a self-oscillating BARITT-diode mixer operating in the V band at 60 GHz.

❑ Return to main document.