Abstracts

Theory of Noise and Transfer Properties of IMPATT Diode Amplifiers

J.J. Goedbloed and M.T. Vlaardingerbroek. "Theory of Noise and Transfer Properties of IMPATT Diode Amplifiers." 1977 Transactions on Microwave Theory and Techniques 25.4 (Apr. 1977 [T-MTT] (Special Issue on Low-Noise Technology)): 324-332.

A theory is formulated which describes quantitatively the noise and transfer properties of IMPATT diode reflection-type negative resistance amplifiers. This theory is based on the method used in the large-signal theory of noise in IMPATT diode oscillators by the present authors. The theory takes into account the signal dependence of the noise generation in the diode, the noise and/or modulation present in the input signal, and also the intermodulation effects occurring between the various frequency bands. The equations are conveniently arranged in matrix form; such a formulation makes it easier to obtain quantitative results in terms of measurable noise and modulation parameters. Agreement between measured and theoretically predicted AM and FM noise of injection-locked oscillators is good. The usefulness of the theory is illustrated by results of calculations on minimum attainable noise of a given amplifier, maximum noise allowable on the input signal, AM-FM conversion, phase distortion, bias modulation, and the correlation between various types of noise.

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