Abstracts

Amplitude Behavior of Injection-Locked Oscillators

T.L. Osborne. "Amplitude Behavior of Injection-Locked Oscillators." 1970 Transactions on Microwave Theory and Techniques 18.11 (Nov. 1970 [T-MTT] (Special Issue on Microwave Circuit Aspects of Avalanche-Diode and Transferred Electron Devices)): 897-905.

Subject to a reasonable constraint on the frequency of the amplitude modulation of the injected signal, the reduced amplitude equation for an injection-locked oscillator, a nonlinear differential equation, is reduced to a nonlinear algebraic equation which is solved numerically. AM limiting, power limiting, and output-power increment are calculated as functions of injected-signal amplitude for several types of negative-conductance nonlinearities. A method of characterizing the conductance nonlinearity from the measured output-power increment is given and is used to characterize avalanche- and tunnel-diode oscillators. Excellent agreement between calculated and measured limiting is shown. In addition to clarifying the amplitude behavior of the locked oscillator, the results show what types of nonlinearities are desirable for limiter applications, that avalanche-diode oscillators have the potential for excellent limiting, and that the output-power increment is indicative of the oscillator impedance match.

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