Abstracts

Negative Differential Resistance (NDR) Frequency Conversion with Gain (Short Papers)

R.J. Hwu, A. Djuandi and S.C. Lee. "Negative Differential Resistance (NDR) Frequency Conversion with Gain (Short Papers)." 1993 Transactions on Microwave Theory and Techniques 41.5 (May 1993 [T-MTT]): 890-893.

The dependence of the conductance of negative differential resistance (NDR) devices in the presence of an rf signal of varying amptitude has been theoretically analyzed. Variable absolute negative conductance has been observed in both unbiased resonant tunneling devices and biased tunnel diode when the applied pump power is within the correct range. The theoretical observation of the dependence of the dc conductance of the NDR devices on the power level of the applied Pump signal is supported by the experimental results. Absolute negative conductance of NDR devices provides the possibility of oscillation and harmonic oscillation up to the cut-off frequency of the device. Biased oscillators and self-oscillating frequency multipliers have been experimentally demonstrated using a tunnel diode. Unbiased oscillators have also been successfully realized with two back-to-back connected tunnel diodes which exhibit an anti-symmetrical I-V characteristic.

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