Abstracts

A Design Theory for Wide-Band Parametric Amplifiers

S. Egami. "A Design Theory for Wide-Band Parametric Amplifiers." 1974 Transactions on Microwave Theory and Techniques 22.2 (Feb. 1974 [T-MTT]): 119-125.

A new exact design theory for a nondegenerate parametric amplifier with double-tuned signal circuit and single-tuned idler circuit is described. If the resistance of the signal circuit, which is neglected in previous papers, is considered, there exists a frequency band in which the amplifier gain is positive. In this paper the band characteristics of the gain are related to this frequency band. Slope parameters of the idler and signal circuits are normalized by the slope parameters which are associated with the diode itself. These normalized slope parameters are used to relate the actual circuit and gain-bandwidth characteristics. The slope parameter of the external signal resonator is related to the negative slope parameter of the diode, and bounds on this ratio are given over which stable amplification is possible. A design table which gives the coupling ratio and slope parameter of the external signal resonator is derived by computer calculation. Experiments were made at 19 GHz. Positive-gain bandwidth was around 4.0 GHz, and flat bandwidth at 10-dB gain was 2.4 GHz. The ratio of these bandwidths coincided with the theory.

❑ Return to main document.