Abstracts

Practical Design and Performance of Nearly Optimum Wide-Band Degenerate Parametric Amplifiers (Nov. 1961 [T-MTT])

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The design of a two-resonator single-diode degenerate parametric amplifier is described, which incorporates features that give it nearly optimum wide-band performance. These features include the use of almost lumped circuit elements, a separate pump resonator which is very lightly coupled to the diode and pump circuits, and a diode resonated in series rather than in shunt, from which several advantages accrue. A bandwidth of 21 per cent with 15-db midband gain (double channel) is obtained at 1 Gc using two resonators, as compared with 8 per cent using one resonator. Both measured responses are found to be in excellent agreement with theoretical responses obtained with a digital computer. The measured double-channel noise figure was 1 db. Theoretical and experimental results are presented which show this type of amplifier to be remarkably insensitive to tuning errors. Good results were also obtained using two identical amplifiers in balanced operation with a 3-db coupler so as to eliminate the need for a circulator.

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