Abstracts

The Negative-Conductance Slot Amplifier

M.E. Pedinoff. "The Negative-Conductance Slot Amplifier." 1961 Transactions on Microwave Theory and Techniques 9.6 (Nov. 1961 [T-MTT]): 557-566.

It has been suggested that the incorporation of active solid-state devices into the elements of an antenna may lead to the simplification of the over-all microwave system and at the same time to a reduction in size, power and weight requirements. This paper will discuss several approaches to a study of the microwave properties of a slotted antenna element shunted by a tunnel diode biased into its negative-conductance region. The first approach involves calculation of the lumped parameter equivalent circuit of the slot amplifier system at resonance and can be extended to determination of the gain bandwidth and noise performance of the device, whereas the second approach is concerned with the admittance of the slot and the diode as a function of frequency over a wide frequency range. The latter method of analysis successfully predicts the conditions of oscillation and amplification at fundamental as well as higher frequency resonances and leads to a method for stabilization of the system. Preliminary experimental results indicate a transmission gain of 21.5 db at 2.7 kMc with a Hughes Number PC-3 GaAs tunnel diode in the slot amplifier.

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