Abstracts

Prototypes for Use in Broadbanding Reflection Amplifiers

W.J. Getsinger. "Prototypes for Use in Broadbanding Reflection Amplifiers." 1963 Transactions on Microwave Theory and Techniques 11.6 (Nov. 1963 [T-MTT]): 486-497.

This paper tabulates, as functions of reflection gain and ripple, the element values of negative-resistance terminated, prototype, low-pass, lumped-element ladder networks of normalized impedance and bandwidth. (The values are calculated using known synthesis methods.) Next, it provides a technique for relating the characteristics of any actual narrow-band, negative-resistance device to the value of the prototype susceptive element adjacent to the negative resistance. When an actual negative-resistance device has been related to a prototype in this manner, the performance of the device with one, two or three additional cascaded resonators can be predicted from given graphs. This allows trade-offs among gain, ripple, and bandwidth, within limits. Finally, the predicted performance can be used with simple formulas and the table of prototype element values to design suitable resonators to broadband the actual amplifier. The tables and techniques of this paper are used successfully to broadband tunnel-diode, maser and parametric-amplifier circuits. This paper allows the practical engineer to estimate the broad-banding potential of any given negative-resistance device and provides him with the proper element values to do so with only a few very simple calculations required.

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