Abstracts

An Analysis of Four-Frequency Nonlinear Reactance Circuits

D.K. Adams. "An Analysis of Four-Frequency Nonlinear Reactance Circuits." 1960 Transactions on Microwave Theory and Techniques 8.3 (May 1960 [T-MTT]): 274-283.

Several advantages of multiple-frequency nonlinear reactance circuits are described in this paper. In particular, a circuit is considered in which a nonlinear reactance couples four basic frequencies: omega/sub 0/, omega/sub 1/, omega/sub 2/, and omega/sub 3/; these are so related that omega/sub 2/ = omega/sub 0/ + omega/sub 1/ and omega/sub 3/ = omega/sub 0/ - omega/sub 1/. Here, omega/sub 0/ is taken to be the power source or pump. It is found to be desirable to allow for the possible presence of the pump harmonic, 2omega/sub 0/, and individual cases are characterized by whether 2omega/sub 0/, is present or not. The major results are as follows: 1) Unlimited amplification gain is theoretically possible at frequencies higher than the pump, by reflecting negative input resistance at omega/sub 2/, but without relying on any effects due to pump harmonics. 2) Unlimited up- or down-conversion gains between omega/sub 1/ and omega/sub 2/ are theoretically possible in the additional presence of the first pump harmonic, but without reflecting negative input or output resistance. 3) Unlimited amplification gain is theoretically possible at frequencies both lower and higher than the pump fundamental, without reflecting negative input resistance.

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