Abstracts

A General Approach for the S-Parameter Design of Oscillators with 1 and 2-Port Active Devices (Short Papers)

R.D. Martinez and R.C. Compton. "A General Approach for the S-Parameter Design of Oscillators with 1 and 2-Port Active Devices (Short Papers)." 1992 Transactions on Microwave Theory and Techniques 40.3 (Mar. 1992 [T-MTT]): 569-574.

This paper introduces a circular function that serves as a basis for deciding if a circuit will contiguously oscillate. The circular function is derived from the signal flow graph of the circuit including the external load. Any node in the flow-graph can be split into two nodes, one of whlich contains incoming branches and the other containing outgoing branches. The circular function is then the transfer function between the two nodes, and it can be measured or simulated by looking at the reflection coefficient of a circulator inserted at the node that was originally split. Oscillations occur when the circular function is unity. Stability of these oscillations is determined by considering the behavior of the circular function as the circuit saturates. The circular function can be elegantly applied to 1-port oscillators that use negative resistance devices and to feedback oscillators containing transistors, and it reduces to previously published results for specific circuit topologies. To verify the practicality of this approach two 30 GHz HEMT oscillators were designed and tested.

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