Abstracts

A Deterministic Approach for Designing Conditionally Stable Amplifiers

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Microwave devices with the Rollet parameter (k) less than one can always be made stable by resistive loading, In cases where noise figure or output power is at a premium, the performance of an amplifier can often be enhanced by using a design where k is less than unity thereby avoiding resistive loading. While a simultaneous conjugate match is impossible for such conditionally stable designs, single-sided matching can be achieved. Low-noise and power designs are examples where single-sided matching considerations naturally occur. With single-sided matching and 0 < k < 1, a design method is presented that results in device impedances on both the matched and unmatched sides that are always inside the Unit Smith Chart. This condition is referred to as jointly (input/output) stable. Gains resulting from jointly stable terminating impedances are shown to be bounded, the upper bound being given by 2 ·k· maximum stable gain. The design on an output-matched, conditionally stable amplifier is illustrated.

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