Abstracts

Power Gain in Feedback Amplifiers, A Classic Revisited

M.S. Gupta. "Power Gain in Feedback Amplifiers, A Classic Revisited." 1992 Transactions on Microwave Theory and Techniques 40.5 (May 1992 [T-MTT]): 864-879.

This paper is a tutorial review of a classic paper of the same title authored by Samuel J. Mason, and published in 1954. That paper was the first to define a unilateral power gain for a linear two-port, and to prove that this gain is invariant with respect to linear lossless reciprocal four-port embeddings, thereby making it useful as a figure of merit intrinsic to the device. The significance of the paper stems from the fact that (a) it introduced a new fundamental parameter that is now used to evaluate all three-terminal active devices, (b) it initiated work on a new line of inquiry, which has led to the discovery of many other invariants that describe the essential constraints on the behavior of networks, and (c) its results form the foundation for many of the basic ideas currently in use, including those of the cutoff frequency of transistors, activity of devices, stability of amplifiers, and device invariants. The present article brings that original paper up-to-date, presents a tutorial exposition of its contents in a modern form, and points out its significance and applications in microwave engineering. The subsequent advances in the subject area of the paper are also summarized so that the original paper can be placed within a broader context, and understood with a more general perspective.

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