NASA TECH BRIEF

Technique for Lowering the Noise Figure in RF Amplifiers

The analytical procedure devised provides for operating low-level rf amplifiers at noise figures at or near the theoretical minimum, while maintaining high-gain stability. The Linvill or Stern methods, which prescribe means for preventing instability of available circuitry, do not specify conditions for achieving minimum noise figures. Experimental adjustments of the input matching network in order to attain minimum noise figures reduce the stability margin predicted by the Linville or Stern methods and change the frequency response of the amplifier.

In the new procedure, formulas for the minimum amplifier noise figure value are derived from the analytical noise-figure expression involving the parameters of the equivalent circuit representing the actual system (such as an rf receiver). These formulas define an input imbedding network that will give the minimum amplifier noise figure. The output admittance (load conductance plus susceptance) is then deter-

mined from gain and/or stability considerations relating the source- and load-admittance components to the transducer gain of the amplifier.

Note:

Requests for further information may be directed to:

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   and Space Administration
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