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Noise Figure Measurement Concept for Acoustic Amplifiers

A concept has been reported for measuring the noise figure for acoustic amplifiers in a very direct and revealing manner. The report also suggests some of the physical conditions necessary for long-term acoustic memory devices.

The method incorporates the design of optimum-length buffer crystals used in conjunction with an amplifier section whose gain is equal to total structure loss. A signal can thus be admitted at the input and reflected back and forth in the circuit, being amplified each time it passes through the amplifier section, until it is lost in the increasing system noise. Measuring the time required to saturate the signal with noise should give a direct measurement of the amplifier noise figure.

Notes:

1. This method is intended to give a direct measure of the acoustic amplifier alone rather than the sum of various circuit noise figures.

2. The report delves mathematically into the major theoretical considerations and should be useful as a laboratory aid in the study of acoustic amplification.
3. This development is in conceptual stage only, and, as of date of publication of this Tech Brief, neither a model nor prototype has been constructed.

Patent status:

No patent action is contemplated by NASA.

Source: V. R. Johnson and J. R. Yeager
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Category 01