

ELE2EMI 2007

Electronics Measurements and Instrumentation

19 Noise Measures, Shielding and Filtering

References

- *Berlin and Getz*, chapter 4, pages 93-97.

Outline

1. Noise Measures
2. Shields
3. Filters

19.1 Noise Measures

19.1.1 Signal-to-Noise Ratio

The **signal-to-noise ratio**, S/N , describes the portion of power *accompanying* a signal that is due to noise. It is defined as the ratio of the signal power to the noise power, expressed in decibels.

$$S/N = 10\log_{10}\left(\frac{P_S}{P_N}\right) = 20\log_{10}\left(\frac{V_S}{V_N}\right)$$

where P_S is the signal power, V_S is the signal voltage, and similarly for the noise.

19.1.2 Noise Figure

The noise figure, NF, measures the noise added to a signal by a circuit, amplifier or network. It is defined as:

$$NF = (S/N)_{\text{input}} - (S/N)_{\text{output}}$$