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Daksh Khosla

210050102007

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Department of Electronics and Communication Engineering

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<u>Gain and Noise Calculations of Amplifiers in a Cascaded Systems Using MATLAB</u>

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Gain and Noise Factor

A number of parameters, including gain, signal-to-noise ratio, and noise, are crucial to communication systems' operation.

Gain is a measure of the ability of a circuit (often an amplifier) to increase the power or amplitude of a signal from the input to the output. Noise deteriorates the quality of the received signal (in case of analogue systems) and degrades the throughput (in case of digital systems). Therefore it is important to maximize **signal-to-noise ratio** in a communication system.
The **noise figure** is a measure of the degradation of the SNR. In cascaded systems, the total noise factor depends upon the gain and NF of each block (or stage). For example, in the case of amplifiers connected in cascade, each amplifier will add its own noise. Hence the overall noise factor will be due to the contribution by each amplifier.

How will I do it

Matlab (**MATrix LABoratory**) is a proprietary multi-paradigm programming language and numeric computing environment developed by MathWorks.
The Matlab is utilized in this project to create a noise factor calculator. These calculators are simply made by experimenting with Matlab's array and matrix properties. They can be applied to any number of stages in a cascade system. A **flowchart** is used to explain this Matlab program.