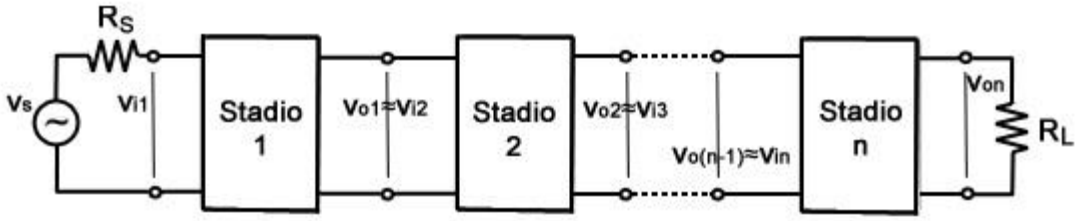
Multistage Amplifier

The power gain otherwise voltage gain can be achieved by the single-stage amplifier but it is not enough in practical application. For that, we have to use multiple stages of amplification for achieving the required voltage gain or power. This kind of amplifier is termed as a **multistage amplifier analysis**. In this amplifier, the first stage output is fed to the next stage input. Such type of connection is commonly known as cascading. This article discusses an overview of the multi-stage amplifier and its frequency response.

Multistage Amplifier

In amplifiers, cascading can also be done for getting an accurate input & output impedance for exact applications. Based on the kind of amplifier used within separate stages, these amplifiers are classified into different types.

'This amplifier using one or more single stage common emitter amplifier is also named as a cascaded amplifier.



multistage-amplifier

A **multistage amplifier design** using CE (common-emitter) as the primary stage as well as CB (common base) as the second stage is named as a cascade amplifier. The connection between cascade & cascade can also possible using FET amplifiers.

Whenever the amplifier is cascaded, then it is required to employ a coupling network among o/p of one amplifier as well as i/p of the multistage amplifier. This kind of coupling is also named as interstage coupling. In this amplifier, there are three **multistage amplifier types** are used like RC coupling, transformer coupling, and direct coupling.

RC Coupling

The resistance-capacitance coupling is the most frequently used method as well as less cost. It has an acceptable frequency response. In this kind of coupling, the developed signal across the collector resistor of every stage that is coupled throughout o/p coupling capacitor toward the base terminal of the next stage. The coupling capacitor separates the DC states from the primary stage to the below stages. **Transformer Coupling**

In this type of coupling, the signal expands across the main winding of the transformer and it performs as a load. The minor winding moves the AC o/p signal straight toward the base

terminal of the next stage. This method enhances the total gain & matching level impedance. But the transformer using a wide frequency response can be extremely expensive.

Direct Coupling

The indirect coupling technique, the AC o/p signal can be fed straight to the further phase; no reactance can be used within the coupling set-up. This coupling can be used as amplification of the low-frequency signal is to be completed.

Multistage Amplifier Frequency Response

The gain's phase-shift & amplifier's voltage gain mainly depends on the range of frequency over the operation of the amplifier. Generally, the total range of frequency can be separated into 3-types like high-frequency range, mid-frequency, and low-frequency range.

- Generally, for the analysis of these amplifiers, we require to find out dissimilar parameters.
- The voltage gain of this amplifier is equivalent to the product of voltage gain result of separate stages.
- The current gain of this amplifier is equivalent to the product of the current gain result of separate stages
- Input impedance is the first stage's impedance
- Output impedance is the last stage's impedance

Advantages/Applications of Multistage Amplifier

The **advantages of the multistage amplifier** are flexibility within input & output impedance and higher gain.

The **multistage amplifier applications** are, it can be used to increase extremely weak signals to utilizable levels. The distortion can be reduced by changing the signal within stages. At present, any electronic device can process digital or radio electrical signals by including a multistage-amplifier.