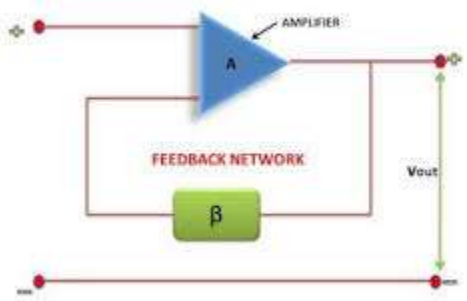
SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

23EET104 / ANALOG ELECTRONICS CIRCUITS
I YEAR / II SEMESTER



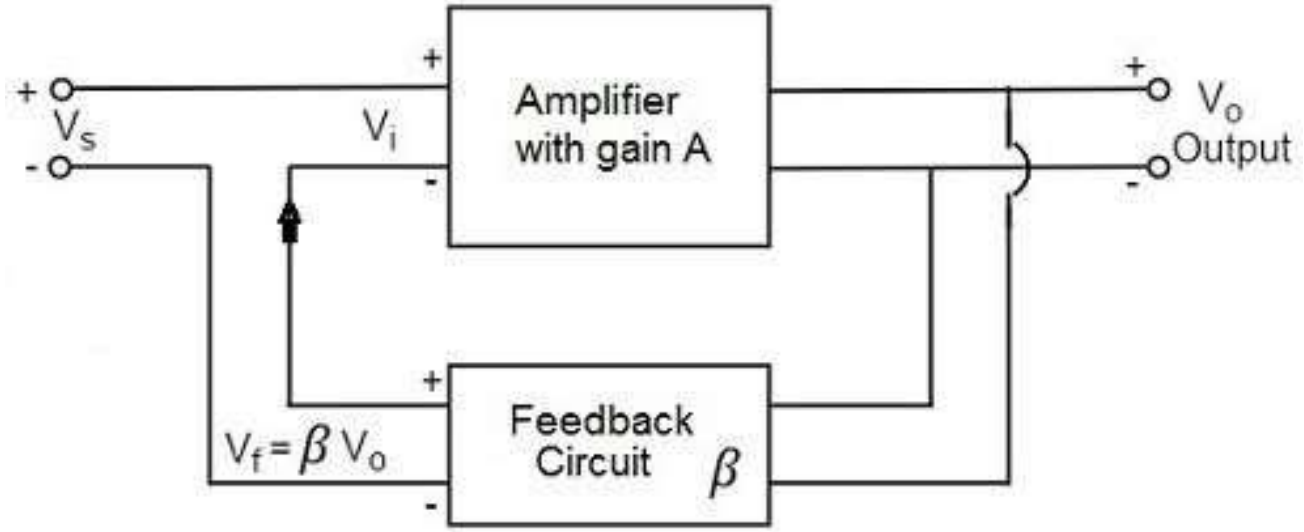
UNIT-V: FEEDBACK AMPLIFIER & OSCILLATOR

FEEDBACK AMPLIFIER

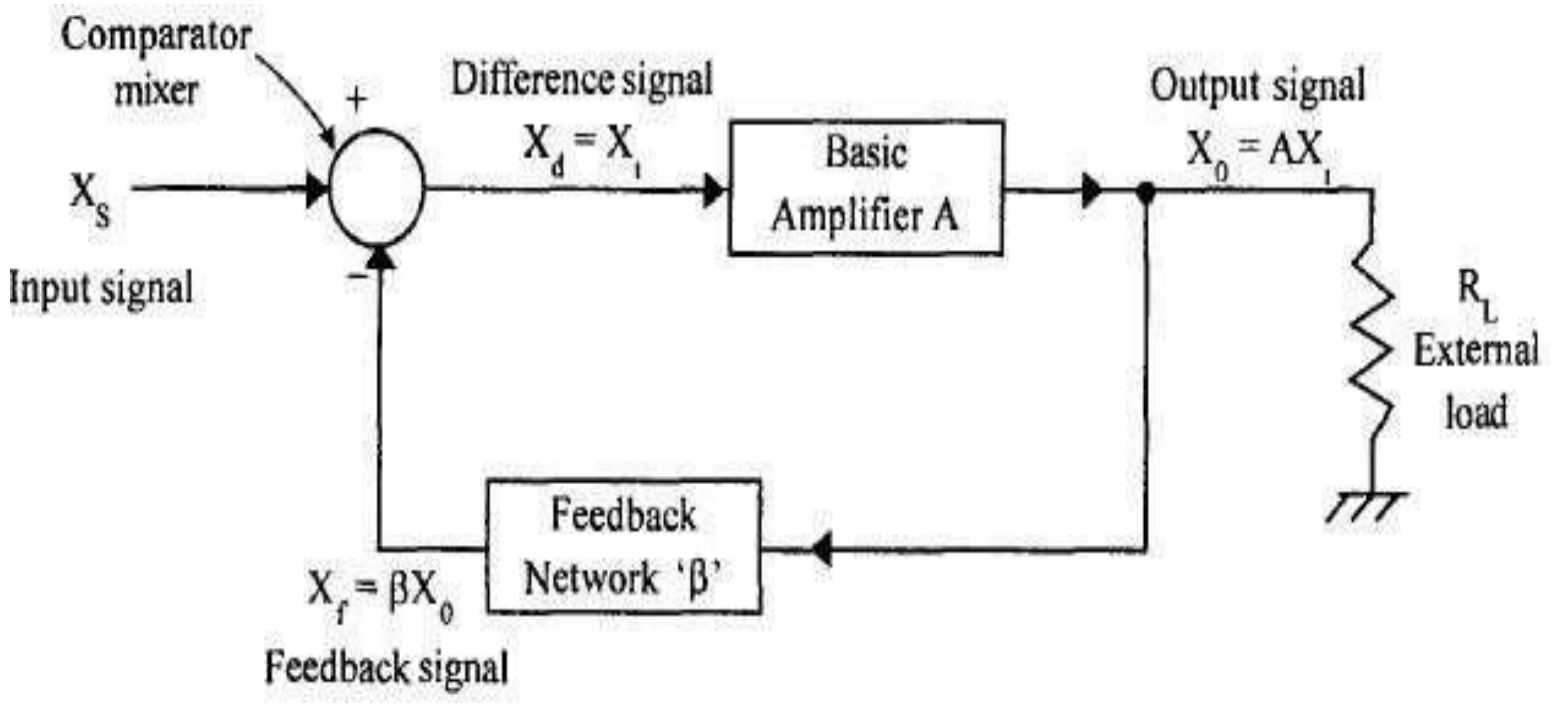
Principle of Feedback Amplifier

A feedback amplifier generally consists of two parts. They are the **amplifier** and the **feedback circuit**.

The feedback circuit usually consists of resistors. The concept of feedback amplifier can be understood from the following figure.



Principle of Feedback Amplifier



Generalized feedback amplifier

Principle of Feedback Amplifier

The gain of the amplifier is represented as A.

The gain of the amplifier is the ratio of output voltage V_o to the input voltage V_i.

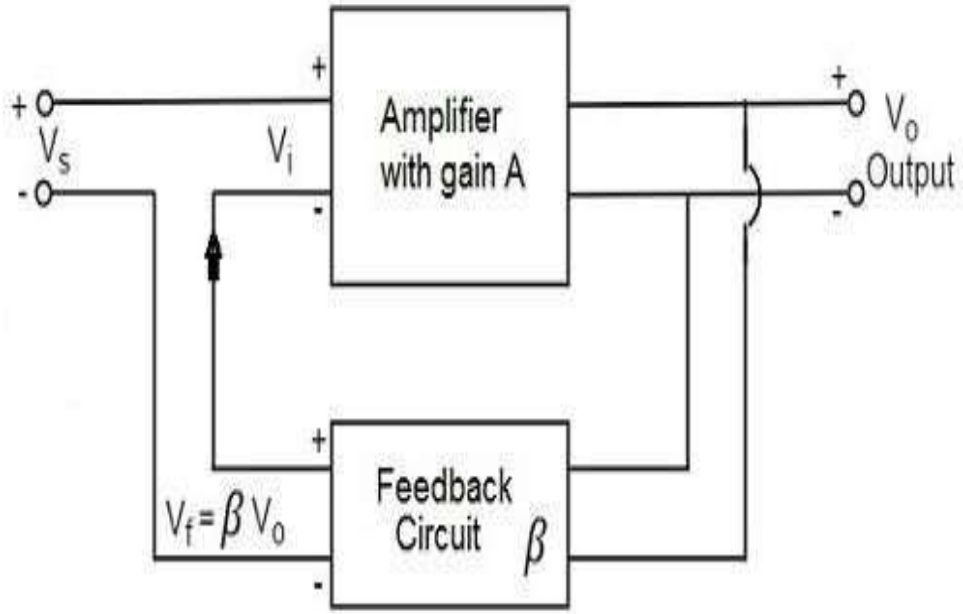
The feedback extracts a voltage $V_f = \beta V_o$

For negative feedback, let signal voltage V_s.

$$\mathbf{Vi = vs - Vf}$$

$$\mathbf{Vi = Vs - \beta Vo}$$

Where, $\beta = V_f/V_o$ is feedback ratio.



The output V_o = Vi * A

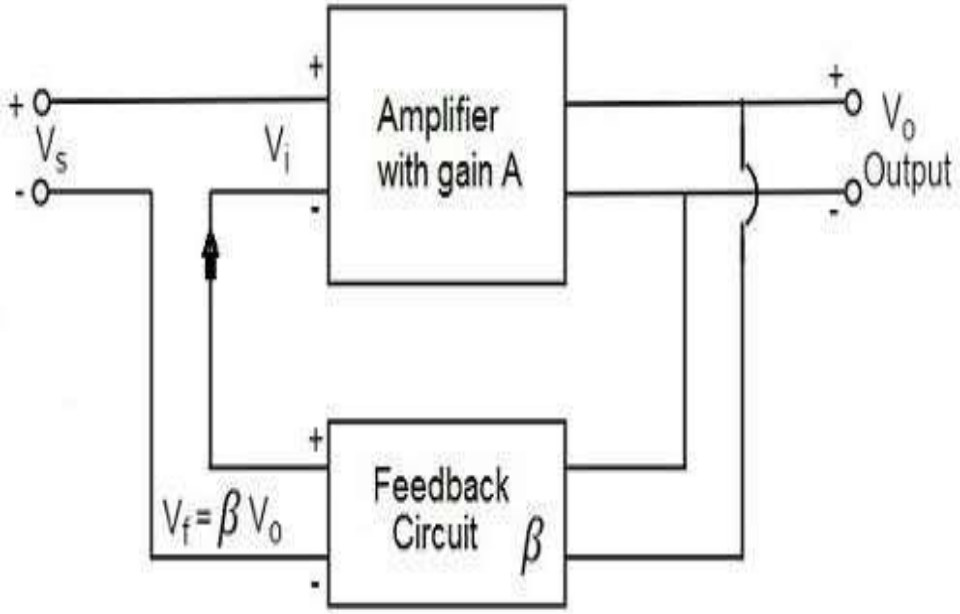
Hence,

$$(Vs-\beta Vo)A=Vo$$

$$AVs-A\beta Vo=Vo$$

$$AVs=Vo(1+A\beta)$$

$$Vo/Vs=A/(1+A\beta)$$



Therefore, the gain of the amplifier with feedback is given by

$$A_f = A/(1+A\beta)$$

Effect of Negative feedback on Amplifier

The effect of negative feedback on an amplifier is considered in relation to gain, gain stability, distortion, noise, input/output impedance and bandwidth.

Gain of the amplifier is $A_f = A/(1+A\beta)$

Gain: Gain decreases with feedback

Gain stability: Extremely Stable

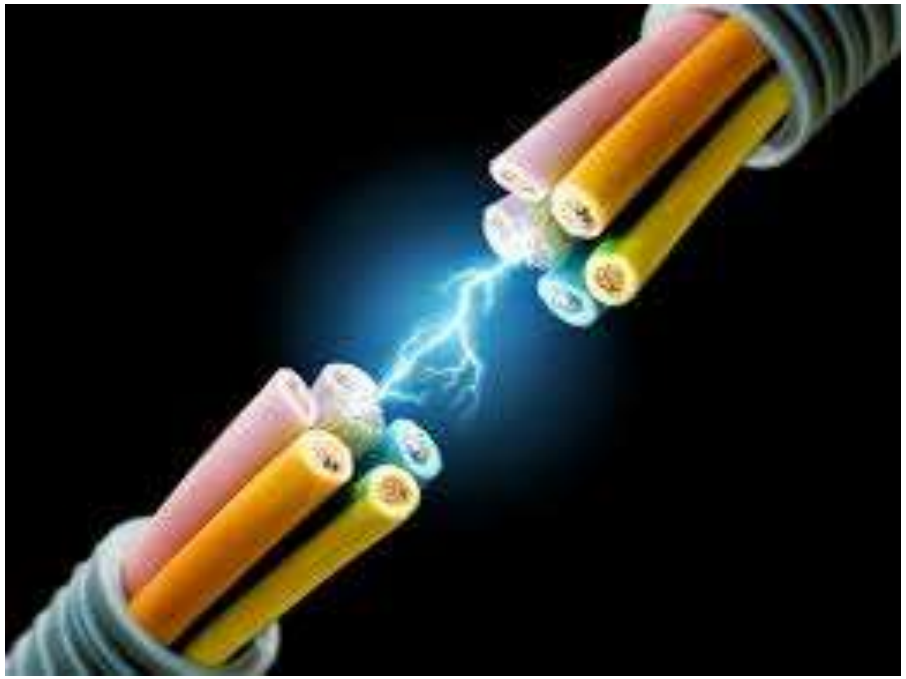
Distortion: **$D_f = D/(1+A\beta)$,** distortion is reduced by a factor **$(1+A\beta)$**

Noise: **$N_f = N/(1+A\beta)$, reduction in noise**

Input/output impedance: Improve by a factor **$(1+A\beta)$**

Bandwidth: Bandwidth product remains constant.

RECAP….



…THANK YOU