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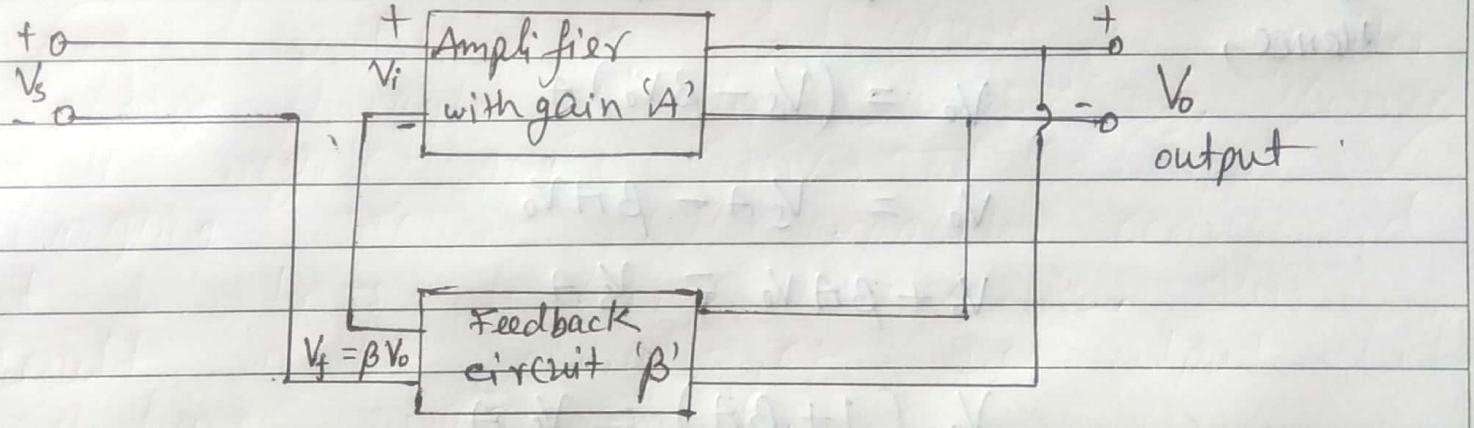
Lecture- No- 43.

* Comparison of Different types of Rectifiers :-

Properties of Rectifier	Half-Wave Rectifier	Full-Wave (Center tapped) Rectifier	Full-Wave (bridge) Rectifier
(1) Number of diodes present in the circuit	1	2	4
(2) Dc-average current	I_m/π	$2I_m/\pi$	$2I_m/\pi$
(3) Ripple factor	1.21	0.482	1.482
(4) maximum efficiency	40.6%	81.2%	81.2%
(5) Peak inverse voltage	V_m	$2V_m$	$2V_m$
(6) RMS voltage	$V_m/2$	$V_m/\sqrt{2}$	$V_m/\sqrt{2}$
(7) RMS current	$I_m/2$	$I_m/\sqrt{2}$	$I_m/\sqrt{2}$

* Feedback Amplifiers :→

A process by which some part or fraction of output is combined with the input is known as feedback, or we can say feedback amplifier are the type of amplifiers in which a part of the output is given back to the input. A feedback Amplifier generally consist of two parts. They are the amplifiers and the feedback circuit. The feedback circuit usually consist of resistors. The concept of feedback amplifier can be understood from the following diagram.



From the above diagram the gain of the amplifier represent as 'A'. The gain of the amplifier is the ratio of output voltage (V_o) to the input voltage (V_i). The feedback network extracts a voltage $V_f = \beta V_o$ from the output (V_o) of the amplifier.

This voltage is added for positive feedback and

Subtracted for negative feedback. From the signal voltage V_s. Now

$$V_i = V_s + V_f = V_s + \beta V_o \quad \text{+ve feedback}$$

and $$V_i = V_s - V_f = V_s - \beta V_o \quad \text{-ve feedback}$$

The quantity $\beta = V_f/V_o$ is called as feedback ratio or feed back fraction.

Let us consider the case of negative feedback. The output must be equal to the input voltage $(V_s - \beta V_o)$ multiplied by the gain 'A' of the amplifier.

Hence,

$$V_o = (V_s - \beta V_o) A$$

$$V_o = V_s A - \beta A V_o$$

$$V_o + \beta A V_o = V_s A$$

$$V_o (1 + \beta A) = V_s A$$

$$\frac{V_o}{V_s} = \frac{A}{(1+\beta A)}$$

Let A_f be the overall gain (gain with feedback) of the amplifier.

i.e $$A_f = \frac{V_o}{V_s}$$

$$\boxed{A_f = \frac{A}{1+\beta A}} \quad \text{-ve feedback.}$$

For +ve feed back $\boxed{A_f = \frac{A}{1-\beta A}}$ +ve feed back.