

# Introduction to Oscillators

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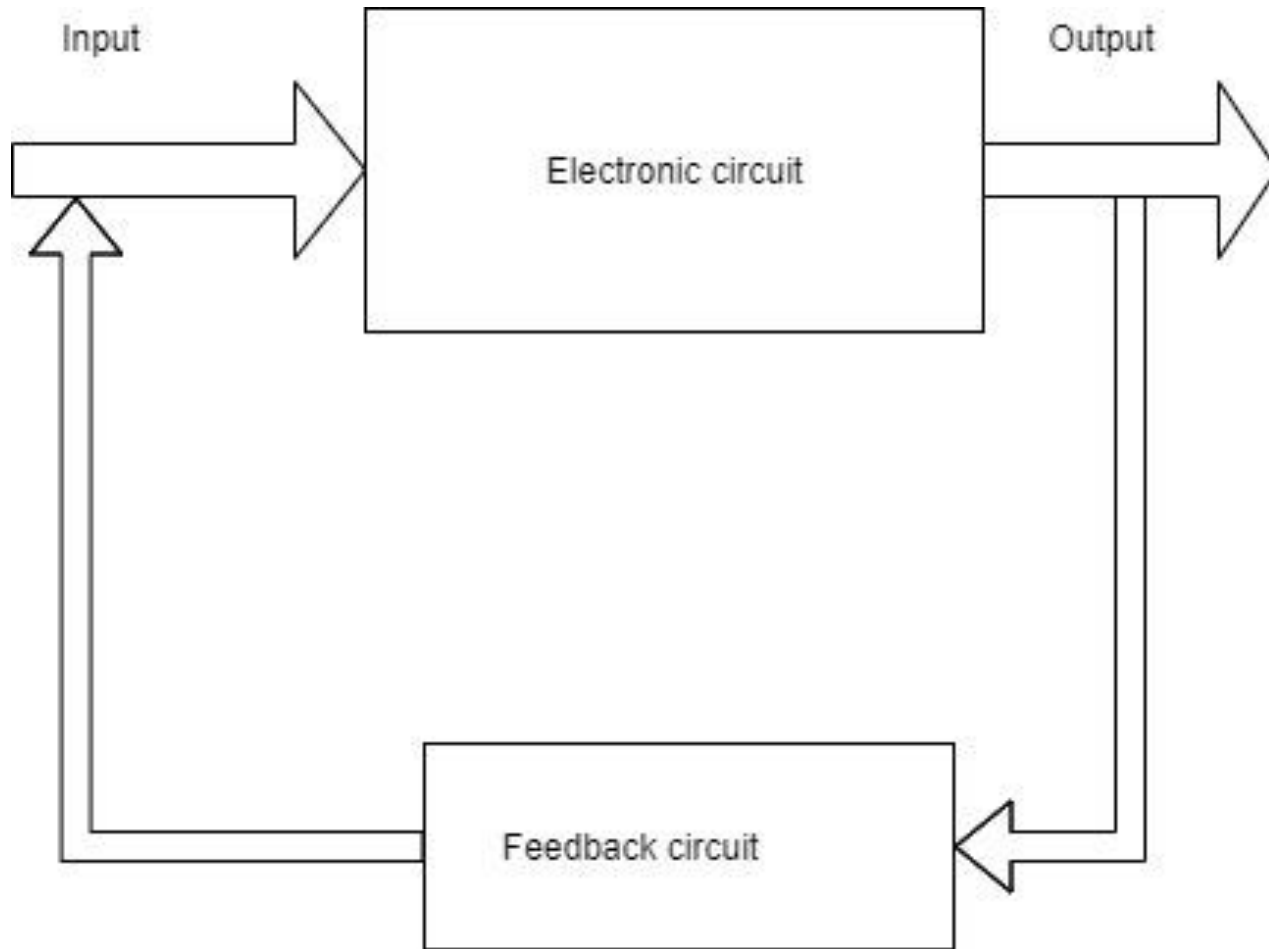
# Feedback

When an input is given to an electronic circuit, an output is produced. When a part of the output is returned to the input so that the value of the input is affected, the process is called feedback .

**Positive feedback:** Portion of the output that is fed back is in phase with the input so that the input strength increases.

**Negative feedback:** Portion of the output that is fed back is out of phase with the input so that the input strength decreases.

**Feedback circuit:** A circuit that produces feedback in another circuit is called feedback circuit.



## Feedback

The process of returning a portion of the output of a circuit back to its input.

## Feedback circuit

A circuit that acts to return a portion of output energy of a circuit back to its input.

## Feedback fraction

The ratio of the amount of output energy fed back to the original output.

## Positive feedback

Feedback energy is in phase with input. So it adds to the input.

## Negative feedback

Feedback energy is out of phase with input. So it

# Oscillators

- An oscillator is an Electronic circuit that produces electrical oscillations.
- It works on the basis of positive feedback.
- An electronic oscillator circuit usually consists of a tank circuit, an amplifier circuit and a feedback circuit.

- **Tank circuit** is an electronic circuit that produces electrical oscillations. The output from a tank circuit is usually very small and damped.
- To strengthen the oscillations, the output from the tank circuit is given to an **amplifier** circuit which amplifies the signal.
- Since the signal is damped, a **feedback circuit** that produces positive feedback and supplies energy to compensate for the energy loss due to damping is used.
- Thus sustained electrical oscillations are obtained.

# Barkhausen condition

In order to get continuous undamped output from the circuit, Barkhausen condition must be satisfied.

ie,  $A_m=1$

Where  $A$ = Voltage gain of amplifier without feedback

$m$ = feedback fraction

THANK YOU