

ANALOG PULSE MODULATION SCHEMES

Pulse Modulation:

The process of transmitting the signals in the form of pulses by using some special techniques.

There are two types of pulse modulation systems,

1. Pulse Amplitude Modulation
2. Pulse Time Modulation

Pulse time modulation is further divided into,

- Pulse Width Modulation
- Pulse Position Modulation

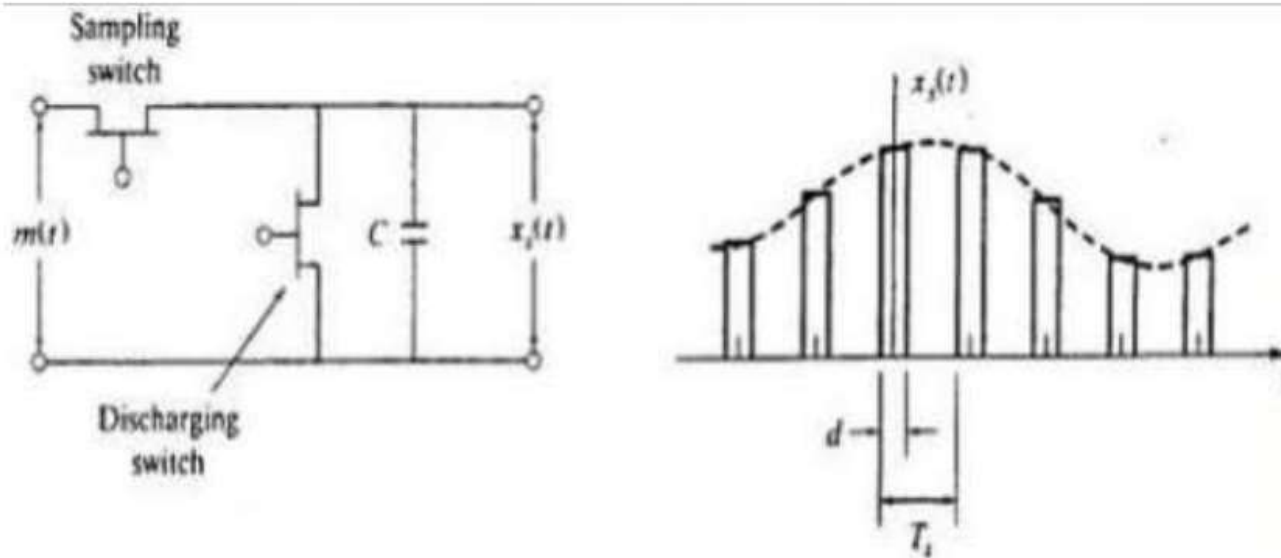
PULSE AMPLITUDE MODULATION(PAM)

In Pulse amplitude modulation, the amplitude of pulses of carrier pulse train is varied in accordance with the modulating signal.

In PAM , the pulses can be flat top type or natural type or ideal type.

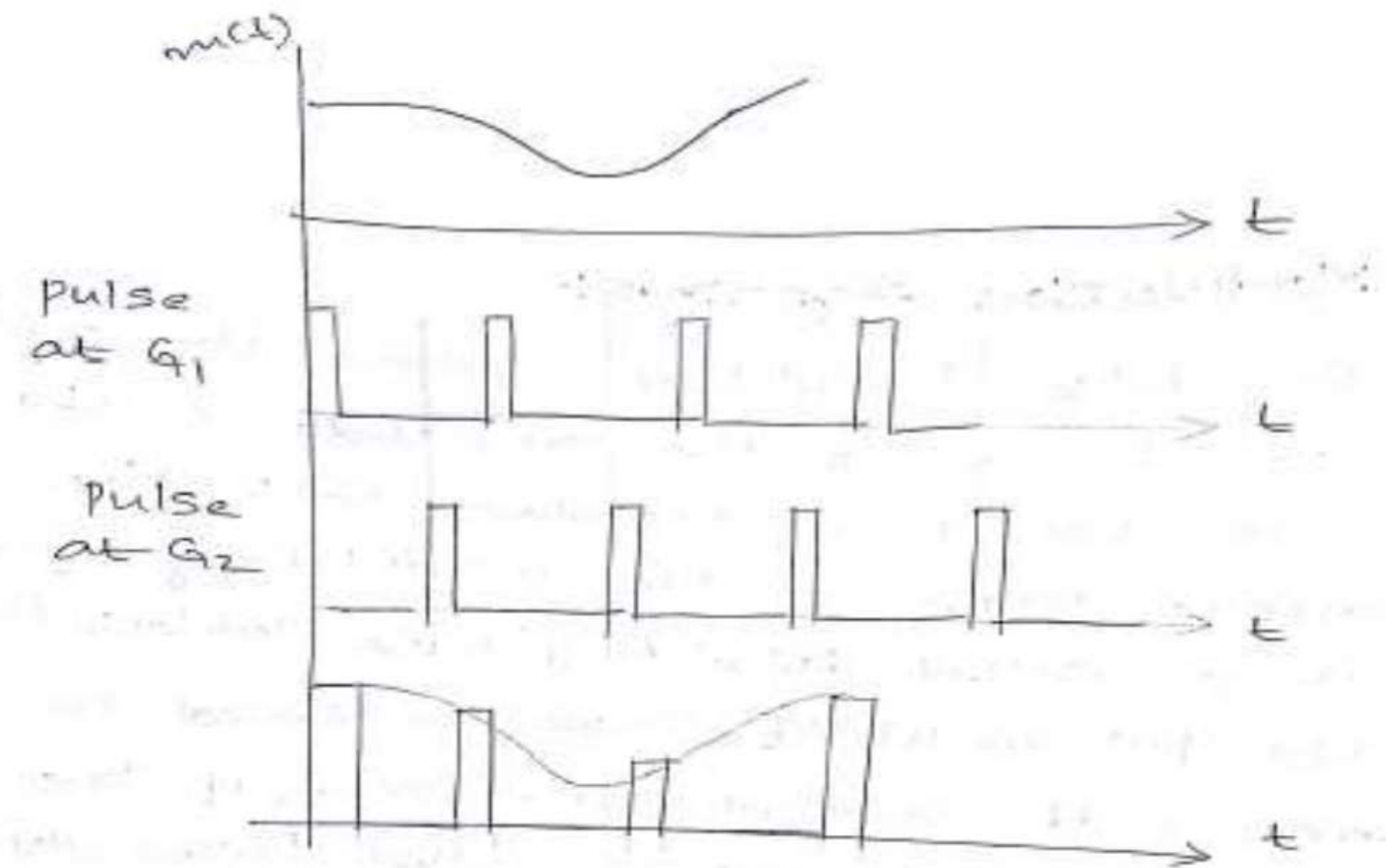
Out of these, flat top PAM is widely used because of easy noise removal.

PAM GENERATION



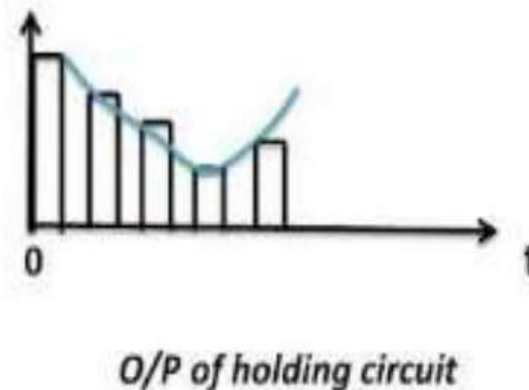
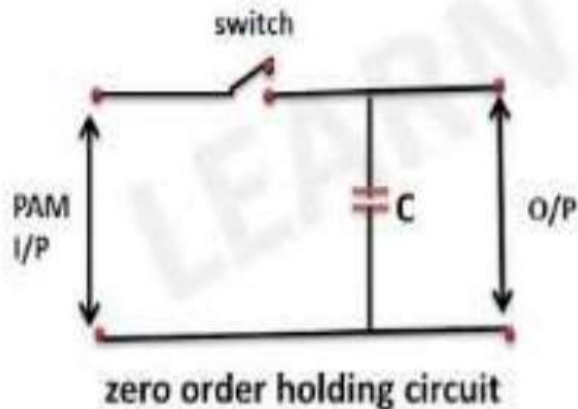
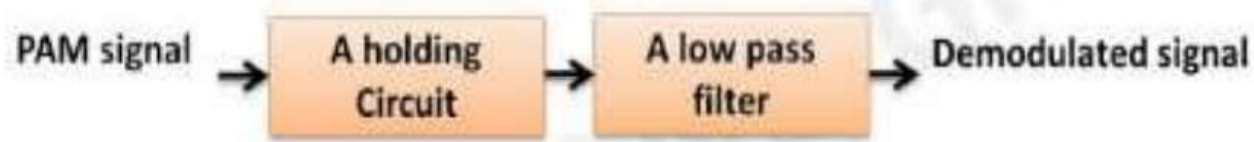
- The sample and hold circuit consists of two FETs and a capacitor.
- The sampling switch is closed for a short duration by a short pulse applied to the gate G1 of transistor.

PAM GENERATION



Demodulation of PAM

Demodulation is the reverse process of modulation in which modulating signal is recovered back from the modulated signal.



Demodulation of PAM

- For PAM signals, demodulation is done using a holding circuit.
- The received PAM signal is first passed through a holding circuit and then through a lowpass filter.
- Switch S is closed during the arrival of the pulse and is opened at the end of the pulse.
- Capacitor C is charged to pulse amplitude value and holds this value during the interval between two pulses.
- Holding circuit output is then passed through a low pass filter to extract the original signal.

Advantages, Disadvantages of PAM

Advantages:

- It is the simple process for modulation and demodulation
- Transmitter and receiver circuits are simple and easy to construct.

Disadvantages:

- Bandwidth requirement is high
- Interference of noise is maximum
- Power requirement is high

Applications:

- Used in microcontrollers for generating control signals
- Used as electronic driver for LED lighting