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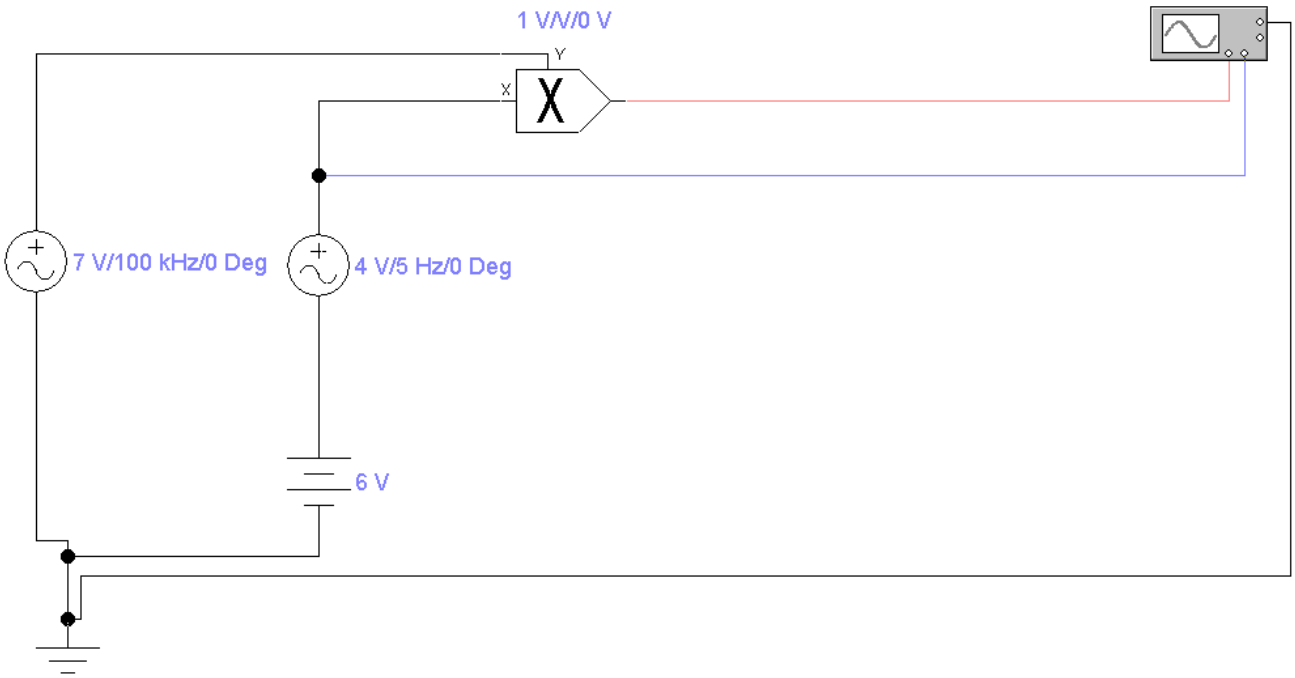
Exp no:5

Exp name: AM modulation & demodulation

is a modulation technique used in electronic communication, most commonly for transmitting messages with a radio carrier wave. In amplitude modulation, the amplitude (signal strength) of the carrier wave is varied in proportion to that of the message signal, such as an audio signal. This technique contrasts with angle modulation, in which either the frequency of the carrier wave is varied as in frequency modulation, or its phase, as in phase modulation.



(1) Circuit of AM modulation

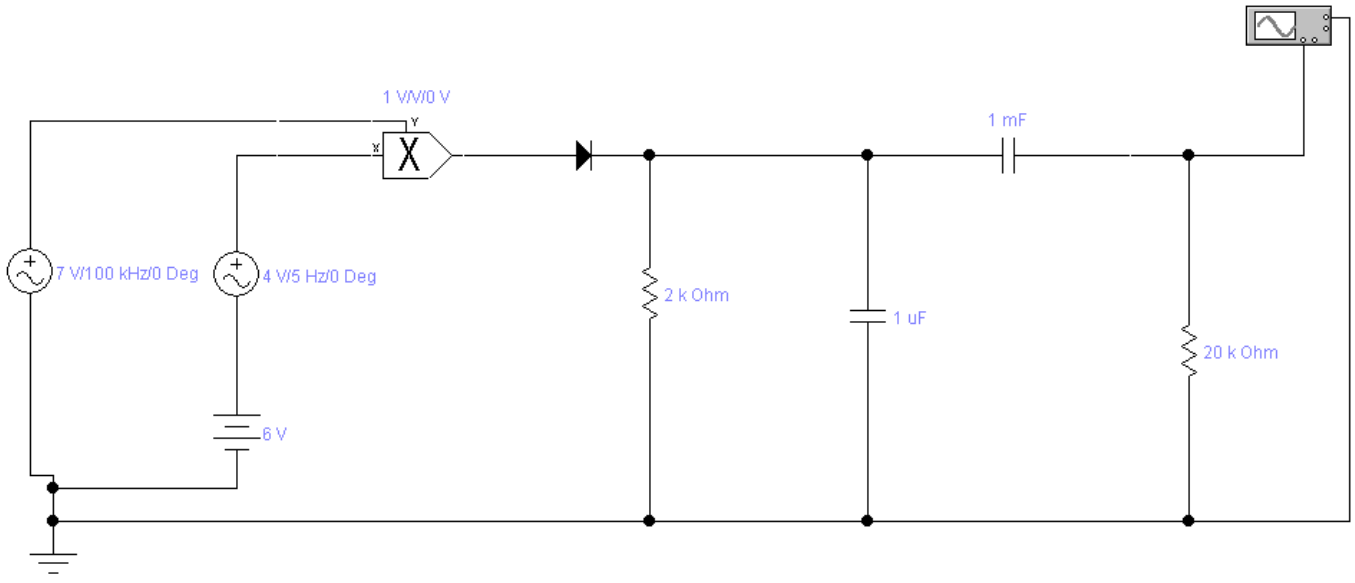
In amplitude modulation, the amplitude or *strength* of the carrier oscillations is varied. For example, in AM radio communication, a continuous wave radio-frequency signal (a sinusoidal carrier wave) has its amplitude modulated by an audio waveform before transmission. The audio waveform modifies the amplitude of the carrier wave and determines the *envelope* of the waveform. In the frequency domain, amplitude modulation produces a signal with power concentrated at the carrier frequency and two adjacent sidebands. Each sideband is equal in bandwidth to that of the modulating signal, and is a mirror image of the other. Standard AM is thus sometimes called "double-sideband amplitude modulation" (DSBAM). Single-sideband amplitude modulation.

A disadvantage of all amplitude modulation techniques, not only standard AM, is that the receiver amplifies and detects noise and electromagnetic interference in equal proportion to the signal. Increasing the received signal-to-noise ratio, say, by a factor of 10 (a 10 decibel improvement), thus would require increasing the transmitter power by a factor of 10. This is in contrast to frequency modulation (FM) and digital radio where the effect of such noise following demodulation is strongly reduced so long as the received signal is well above the threshold for reception. For this reason AM broadcast is not favored for music and high fidelity broadcasting, but rather for voice communications and broadcasts (sports, news, talk radio etc.).

AM demodulation

Demodulation is extracting the original information-bearing signal from a carrier wave. A **demodulator** is an electronic circuit (or computer program in a software-defined radio) that is used to recover the information content from the modulated carrier wave. There are many types of modulation so there are many types of demodulators. The signal output from a demodulator may represent sound (an analog audio signal), images (an analog video signal) or binary data (a digital signal).

These terms are traditionally used in connection with radio receivers, but many other systems use many kinds of demodulators. For example, in a modem, which is a contraction of the terms modulator/demodulator, a demodulator is used to extract a serial digital data stream from a carrier signal which is used to carry it through a telephone line, coaxial cable, or optical fiber.



(2)AM demodulation circuit

Discussion:

Q1 \ What is mean by amplitude modulation ?

Q2 \ Give a brief summary of no more than 20 lines about this type of inclusion ?

Q3 \ where this kind of modulation are used ?

Q4 \ why we use dc voltage with information signal in modulation and demodulation diagram ?