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Communication Systems

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SHORT QUESTIONS ANSWERS:
AMPLITUDE MODULATIONS

Q1. What is amplitude modulation?

Ans: The process of amplitude modulation consists of varying the peak amplitude of a sinusoidal carrier wave in proportion to the instantaneous amplitude of the modulation signal.

Q2. What is modulation?

Ans: Modulation may be defined as the process by which some parameters of a high frequency signal termed as carrier, is varied in accordance with the signal to be transmitted.

Q3.What is the different types of analog modulation?

Ans:

1)Amplitude modulation 2) Angle modulation.

Q4. What is the need for modulation?

Ans: Consider, for example, picture signal of a T.V camera. It has frequency spectra of DC to 5.5MHz.such a wide band of frequency can't be propagated through ionosphere. However, if this signal is modulated with a carrier in VHF and UHF range, the percentage bandwidth becomes very small and the signal becomes suitable for transmission through atmosphere.

Q5. What are the objectives met by modulation?

Ans: Length of antenna is shortened, signal loss is reduced, ease of radiation,

adjustment of bandwidth, shifting signal frequency of the assigned value.

Q6. What are the advantage of PAM and PWM?

Ans: PWM system gives a greater signal to noise ratio as compared to PAM but requires a larger bandwidth to achieve this.

Q7. What is Pulse position modulation?

Ans: Pulse position modulation (PPM) is the process in which the position of a standard pulse is varied as a function of the amplitude of the sampled signal.

Q8. What is the advantage of PPM over PWM and PAM?

Ans: The phase deviation is usually small. The noise produces a smaller disturbing effect on the time position of the modulating pulse train and as a result, PPM waves have a better performance with respect to signal to noise ratio in comparison to PAM and PWM systems.

Q9. What are the applications of pulse position modulation?

Ans: It is primarily useful for optical communication systems, where there tends to be little or no multipath interference. Narrowband RF (Radio frequency) channels with low power and long wavelength (i.e., low frequency) are affected primarily by flat fading, and PPM is better suited.

Q10. What is the purpose of using differential pulse position modulation?

Ans: It is possible to limit the propagation of errors to adjacent symbols, so that an error in measuring the differential delay of one pulse will affect only two symbols, instead of effecting all successive measurements.

Q11. What is the advantage of PPM?

Ans: One of the principle advantages of pulse position modulation is that it is an M-ary modulation technique that can be implemented non-coherently, such that the receiver does not need to use a phase- locked loop (PLL) to track the phase of the carrier. This makes it a suitable candidate for optical communications systems, where coherent phase modulation and detecting are difficult and extremely expensive. The only other common M-ary non-coherent modulation technique is M-ary frequency shift keying, which is the frequency domain dual to PPM.
The other advantages of pulse position modulation are:
□The amplitude is held constant thus less noise interference.
□Signal and noise separation is very easy.

□Due to constant pulse widths and amplitudes, transmission power for each pulse is same.

Q12. What is the application of PPM?

Ans: PPM is employed in narrowband RF channel systems, with the position of each pulse representing the angular position of an analogue control on the transmitter, or possible states of binary switch. The number ofpulseperframegivesthenumberofcontrollablechannelsavailable.Theadvantageo fusingPPMforthis type of application is that the electronics required to decode the signal are extremely simple, which leads to small,light-weightreceiver/decoderunits.(Modelaircraftrequirepartsthatareaslightweightasp ossible).

Q13. Explain the principle of PPM?

Ans: The amplitude and the width of the pulse is kept constant in this system, while the position of each pulse, in relation to the position of a recurrent reference pulse is varied by each instantaneous sampled value of the modulating wave. This means that the transmitter must send synchronizing pulses to operate timing circuits in the receiver. The PPM has the advantage of requiring constant transmitter power output, but the disadvantage of depending on transmitter-receiver synchronization.

Q14. What is the purpose of PPM?

Ans: PPM may be used to transmit analog information, such as continuous speech or data.

Q15. What are the analog analog of PAM, PPM&PWM?

Ans: PAM is similar to AM; PPM and PWM is similar to angle modulation.

Q16. What is Frequency modulation (FM)?

Ans: Frequency modulation is the process of varying the frequency of a carrier wave in proportion to the instantaneous amplitude of the modulating signal without any variation in the amplitude of the carrier wave.

Q17. What is PWM or Pulse length modulation or pulse duration modulation?

Ans: In PWM, the pulse amplitude is kept constant but the leading edge, trailing edge or both may be varied as a function of the amplitude of the sampled signal and care must be taken to ensure that the pulse don’t overlap in a TDM system.

Q18. What are the disadvantages of PWM?

Ans: PWM, in general, requires a greater average power than PAM systems. Also, the PWM system requires a greater bandwidth than PAM

Q19. Explain the principle of PWM?

Ans: Pulse-width modulation (PWM) of a signal or power source involves the modulation of its duty cycle, to either convey information over a communication channel or control the amount of power sent to a load. PWM uses a square wave whose pulse width is modulated resulting in the variation of the average value of the waveform is directly dependent on the duty cycle D.

Q20. Mention the applications of PWM.

Ans: PWM can be used to reduce the total amount of power delivered to a load without losses normally incurred when a power source is limited by resistive means. This is because the average power delivered is proportional to the modulation duty cycle. With a sufficiently high modulation rate, passive electronic filters can be used to smooth the pulse train and recover an average analog waveform.

Q21.What is PAM?

Ans: Pulse amplitude modulation, acronym PAM, is a form of signal modulation where the amplitude of a carrier consisting of a periodic train of rectangular pulses is varied in proportion to the sample values of a message signal. In this type of modulation, the pulse duration is held constant.

Q22.What are the drawbacks of PAM?

Ans: Before sampling a signal, it must be passed through a low-pass filter, so that the higher frequencies are eliminated from the signal and the signal conforms to the requirement of the sampling circuit. Also, the PAM technique has the same signal to noise ratio as the AM. Thus, it is not employed in the practical circuits but may be employed to produce other forms of pulse modulation.

Q23. How is demodulation done in PAM?

Ans: Demodulation is performed by detecting the amplitude level of

the carrier at every period.

Q24. Mention the application of PAM.

Ans: PAM is widely used in baseband transmission of digital data, with non baseband application having been largely superseded by pulse-code modulation and more recently by PPM.

Q25. What is PAM in practical circuits?

Ans: PAM is “pulse shaping”. Essentially, communications engineer realize that the shape of the pulse in the time domain can positively or negatively affect the characteristics of that pulse in frequency domain.

Q26. What is the basic principle of PAM?

Ans: In PAM, the amplitude of individual pulses in the pulse train is varied from its default value in accordance with the instantaneous amplitude of the modulating signal at sampling intervals. The width of the pulse is kept constant.

Q27. What are the advantages of PAM?

Ans: Main advantages of PAM are simple transmitter and receiver design. PAM is used to carry information as well as to generate other pulse modulations.

Q28. What is a filter?

Ans: A filter is a device that passes electric signal at certain frequencies of frequency range while preventing the passage of others.

Q29. What are the different types of filters?

Ans: Low-pass, high-pass, Band-pass, Band-elimination (also referred to as band reject or notch).

Q30.What are active filters?

Ans: Active filters are the circuits that use an operational-amplifier as the active device in combination with some resistors and capacitors to provide an LRC-like filters performance at low frequencies.

Q31. What is a low-pass filter ?

Ans: a low pass filter is a filter that passes low frequency signal but attenuates signal with frequencies higher than the cut-off frequency.

Q32. Why inductors are not often used inactive filters?

Ans: Inductors are bulky and costly and may have large internal

resistive components.

Q33. What is an ideal low pass filter?

Ans: An ideal low pass filter is a network which passes all the frequency up to cut-off frequency fc, and blocks all frequencies above fc.

Q34. What is difference between an ideal and a practical low pass filter ?

Ans: The transition region present in practical filters doesn't exist in an ideal filter. An ideal low-pass filter can be realized mathematically by multiplying a signal by the rectangular function in the frequency domain or, equivalently, Convolution with a sinc function in the time domain.

Q35.What is high-pass filter ?

Ans: a high pass filter is a circuit that attenuates all signals below a

specified cut-off frequency.

Q36. What does the term "pass" mean in any low-or-high pass filters?

Ans: Pass: to cause or permit to go past or through a barrier.

Q37. What does "roll-off" mean?

Ans: It means that if you set the cut-off frequency for say 450Hz, any signal coming through to the input of the filter is96dBdownat 900Hz. Set it for 1KHz, signals at 2KHzaredown96dB.

Q38. What are passive filters?

Ans: Passive filters are implemented using only passive components such as resistors, capacitors and Inductors. These filters do not produce any amplification of the input signal.

Q39. What is a pass band?

Ans: The range of frequencies that is

transmitted.

Q40. What is drop band ?

Ans: The range of frequencies that is

attenuated.

Q41. Why is butter worth filter used most often?

Ans: in many low pass filter applications, it is necessary for the closed loop gain to be as closeto1as possible within the baseband. Butterworth filter is best suited for this type of application.

Q42. What is Band pass filter?

Ans: It passes a band of frequencies and attenuates frequencies on both sides of the pass band. You make take an example of series resonant circuit for the explanation.

Q43. What is sidesl band pass filter ?

Ans: The ideal band pass filter can be used to isolate the component of a time series that lies within a particular band of frequencies.

Q44. What are band reject circuits?

Ans: Band reject filters are tuned circuits that prevent the passage of signal within a specified band of frequencies. These devices are also known as band stop or notch filters.

Q45. Name the types of band rejection filters.

Ans: Twin-T & active Wein-

Robinson circuit.

Q46. What are signal filters?

Ans: Signal filters block or decrease unwanted frequencies or signal

wave characteristics.

Q47. What are digital filters?

Ans: Digital filters use digital signal processing (DSP) to perform numerical calculations on sampled values of a signal.