Electronics Communication
Sem-VI Paper-II DSE-3T

05 THURSDAY 10th Week • 065-301

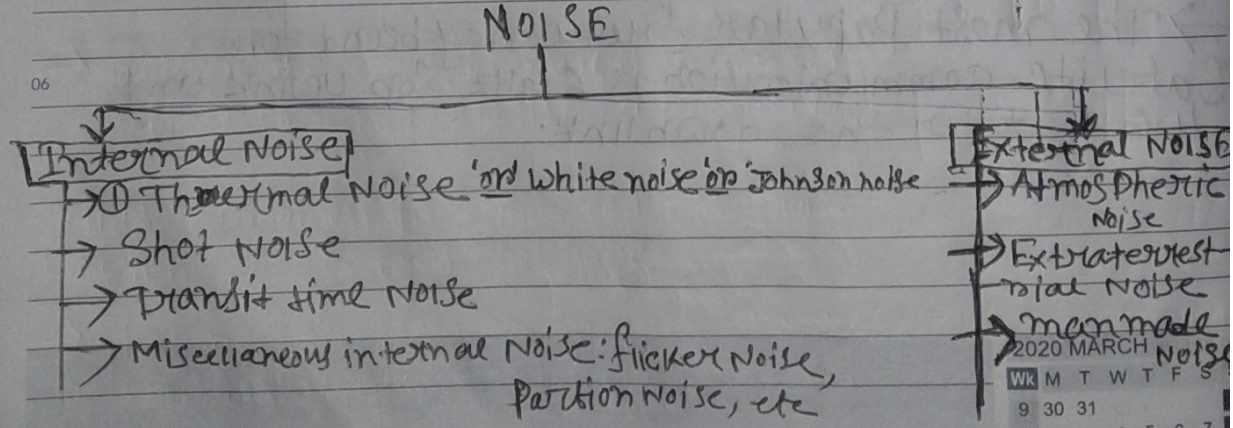
2020 March

Baseband

A baseband signal is an original transmission signal that has not be modulated or has been demodulated to its original frequency. Most telecommunications protocols require baseband signals to be converted, or modulated, to a higher frequency so they can be transmitted over long distances. Therefore, the original baseband, or low pass, signals are converted during the transmission process. When the signal arrives at the destination, it is demodulated so that the recipient receives the original baseband signal. Ethernet is an example of a protocol that does not require signal modulation, since it transmits data in baseband.

NOISE

Noise is an unwanted electrical or electromagnetic energy that interferes with the transmitted message and degrade the quality of message signal.



2020 MARCH

Wk	M	T	W	T	F	S	S
9	30	31					
10	2	3	4	5	6	7	
11	9	10	11	12	13	14	
12	16	17	18	19	20	21	
13	23	24	25	26	27	28	

→ Internal Noise generated within the Receiver or communication System.

→ External Noise generated by the external Sources.

Thermal Noise

This type of Noise is generated by all resistances (e.g. a resistor, Semiconductor, the resistance of resonant circuit ie the real part of impedance, cable etc)

Due to thermal agitation, the molecules in the electrical component gain energy, moves in random fashion and colide each other therefore produces heat and this heat produced is corrosponds to the thermal Noise.

Thermal noise increases with temp and resistance value. Thermal noise power $N = KTB$ watt

Where, K:- Boltz's man constant 1.38×10^{-23} Joules/K
T:- Absolute Temperature
B:- Band width
$KT = N_0$ = Power Spectral density;
Thermal noise = $N = N_0 B$ watt

07 SATURDAY

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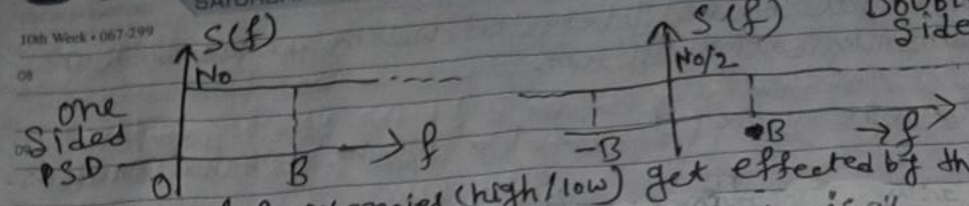


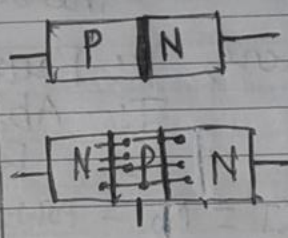
⇒ All range of frequencies (high/low) get effected by thermal noise so this type of Noise is called "white noise"

Shot Noise

Shot noise is produced by the random movement of electron or holes across a PN Junction.

→ The electron or holes enter the junction region from one side, drift or are accelerated across the junction and are collected on the other side.

→ The average junction current determines the average interval that elapses between the times when two Successive carriers enter the junction



→ However the exact interval that elapses is subject to random Statistical Fluctuations

08 Sunday

→ This randomness gives rise to a type of noise which is referred to as Shot noise.

→ Shot noise is also encountered as a result of the random of emission of electrons from a heated surface

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Transit Time Noise :—

→ This noise occurs in the transistors.

→ Transit time is the time duration that is taken by current carrier such as electron or hole to move from the input to the output.

→ At low frequencies this time is negligible. But when the frequency of operation is high, then problem ~~arises~~ arises.

→ The transit time shows up as a kind of random noise within the device and this is directly proportional to the frequency of operation.

Flicker Noise :—

→ Flicker Noise is also known as modulation noise or pink noise

→ This Noise is inversely proportional to the frequency

→ Hence for the frequencies above about 500 Hz, this noise does not creat Serious problem.

10 TUESDAY

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Partition Noise:—

Partition Noise occurs whenever current has to devide between two or more paths, and results from the random fluctuations in the division.

→ Due to this noise diode would be less noisy than a transistor.

External Noise:—

Atmospheric Noise:—

Atmospheric noise is caused by lighting discharges in thunderstorms and other natural electrical disturbances occuring in the atmosphere.

→ These electrical impluses are random in nature Hence the energy is spread over the complete frequency spectrum used for radio communication.

→ Atmospheric noise consist of spurious radio signals with components spread over a wide frequency range.

→ These spurious wave propagated over earth in the same fashion as the desired wave propogated therefore picked up by the receiving antenna.

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→ Large atmospheric noise is generated in low and medium frequency bands, while very little noise is generated in VHF and UHF bands therefore, the atmospheric noise becomes less ~~serve~~ severe at frequencies above 30 MHz.

Extraterrestrial Noise:—

It is devide in two groups —

i) Solar Noise
ii) cosmic Noise

i) Solar Noise →

→ This is electrical noise emanating from the sun.

→ The Sun is large body at a very high temp^{r} (exceeding 6000°c on the surface) and radiates electrical energy in the form of noise over a very wide frequency spectrum used for radio communication.

→ The intensity of noise produced by sun varies with time.

→ Sun has a repeating 11-year noise cycle

→ During peak of noise cycle, high amount of noise is produced that causes tremendous radio signal interference and many frequencies becomes unusable for communication.

2020 APRIL
Wk M T W T F S S
14 1 2 3 4 5
15 6 7 8 9 10 11 12
16 13 14 15 16 17 18 19
17 20 21 22 23 24 25 26
18 27 28 29 30

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ii) Cosmic noise :— This noise is generated by distant stars having temp^n

→ The noise received from distant stars is thermal noise and is distributed almost uniformly over entire sky.

- Man-made Noise or Industrial Noise :—

Industrial noise is an electrical noise produced by the sources such as - automobiles and aircraft ignition, electrical motors and switch gears, leakage from high voltage lines etc.

Such noises are produced by the arc discharge taking place during the operation of ~~very high~~ heavy electrical machines.

Man made noise is most intensive in industrial and densely populated areas.

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Signal to Noise ratio (SNR)

- It is defined as a ratio of Signal Power to noise Power. $\frac{S}{N} = \frac{P_S}{P_N}$ where,
  $P_S \Rightarrow$ Signal Power
  $P_N \Rightarrow$ Noise Power.

- in dB, $\left[\left(\frac{S}{N}\right)_{dB} = 10 \log\left(\frac{P_S}{P_N}\right)\right]$

- Power in terms of voltage,
  $P_S = \frac{V_S^2}{R}$, $P_N = \frac{V_N^2}{R}$

- So SNR will be,

$$\left(\frac{S}{N}\right)_{dB} = 10 \log\left(\frac{V_S^2/R}{V_N^2/R}\right)$$

$$= 10 \log \frac{V_S^2}{V_N^2}$$

$$= 10 \log \left(\frac{V_S}{V_N}\right)^2$$

$$\left[\left(\frac{S}{N}\right)_{dB} = 20 \log \frac{V_S}{V_N}\right]$$

- High SNR is good for transmitter and Receiver.

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Wk	M	T	W	T	F	S	S
14			1	2	3	4	5
15	6	7	8	9	10	11	12
16	13	14	15	16	17	18	19
17	20	21	22	23	24	25	26
18	27	28	29	30			