

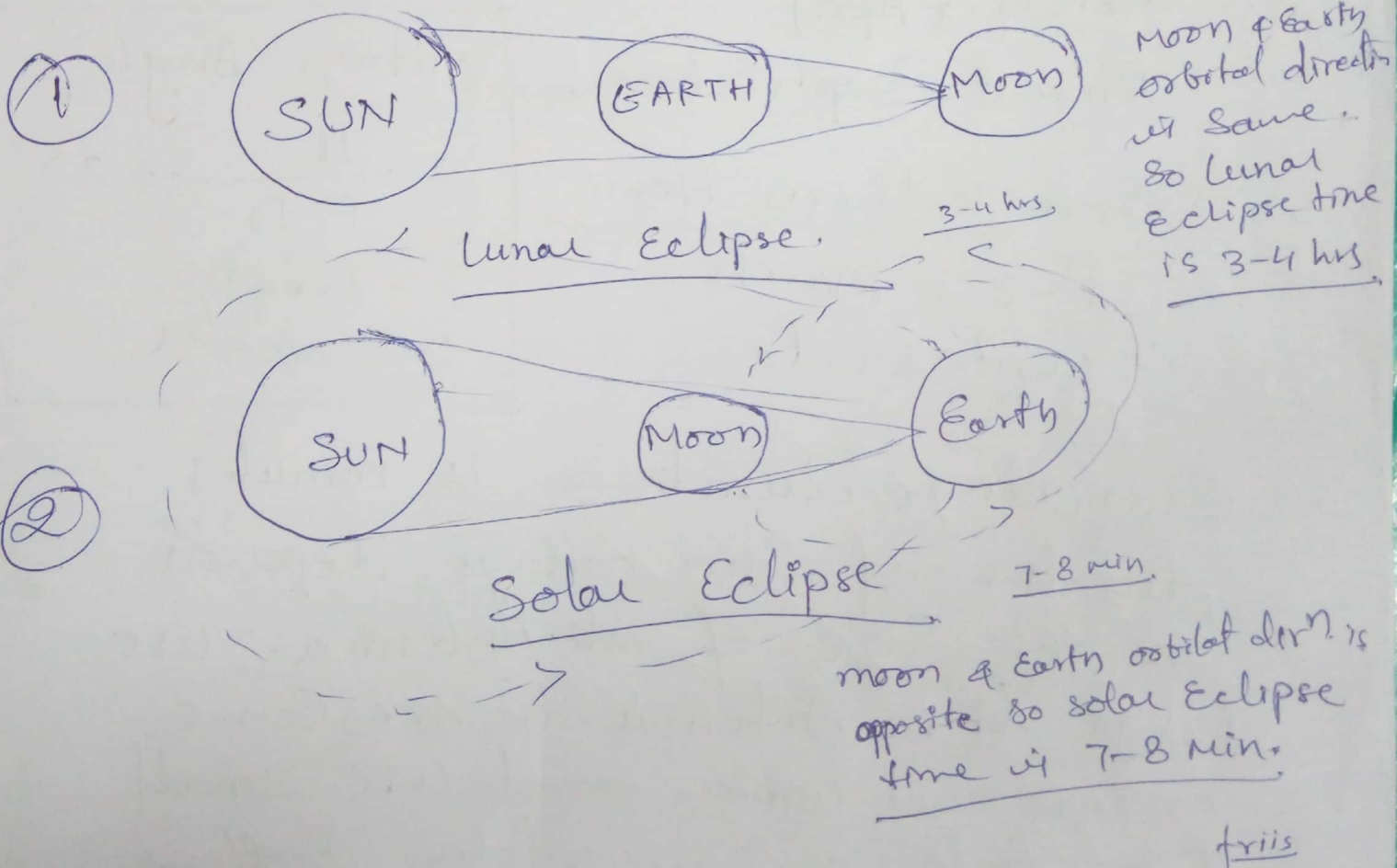
ECLIPSE unit-5

①

Definition - In Linear Position of the Sun, Earth and moon, the shadow of the Earth on Moon is called Lunar Eclipse.

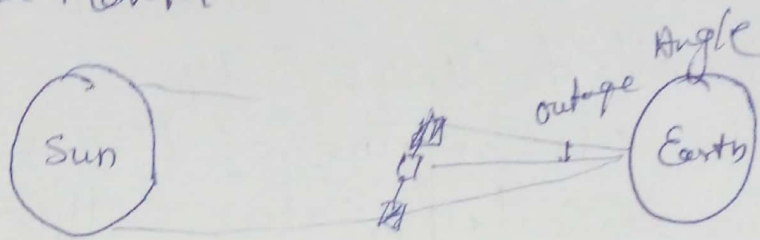
While the obscuration of the Sun Behind the moon is called Solar Eclipse.

Types of Eclipse → ① Lunar Eclipse
② Solar Eclipse



* Sun Transit outage Phenomena:-

Sun outage occur in march or september - october month.



Sun outage duration & Impacts

→ ~~Northern~~ Southern Hemisphere.

march & April

August & September

→ ~~Southern~~ Northern Hemisphere

Feb & March

sept. & octo

outage Angle

$$= \frac{11}{F \cdot D} + 25^\circ$$

F = freqⁿ

D = Diameter

→ Sun outage duration = 12 minutes.
duration of Sun outage depends on the size of antenna. use large size antenna to overcome or less this problem. and use small size antenna sun outage problems are more time duration.

Conclusion of sun outage

→ In Sun outage, twice in a year.

for few days, around 12 mins.

which results losses of signal in

Receiving Antenna not available in this time.

P₁ & P₂ talking to each other then suddenly.

P₃ a new person voice interferes on P₁, P₂ will

hear the P₃'s voice or shouted instead of P₁'s voice.

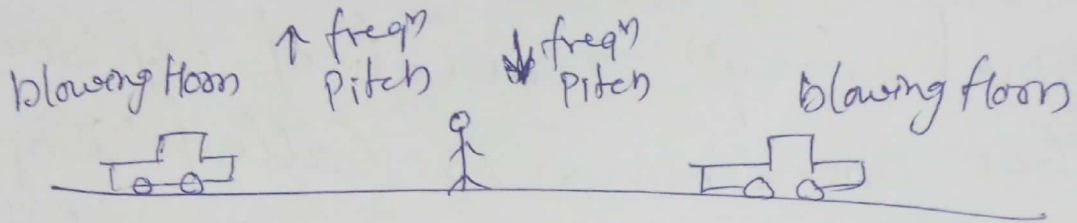
P₃
P₁ → P₂
cross talk →

Doppler Effect

(2)

Motion Related Change in freqⁿ of Sound is doppler effect.

(Johann Christian Doppler)



① Source & observer both at Rest

frequency = f (Same freqⁿ Sound.)

② Source at rest, & observer in motion

$$f_{ap} = f \left(\frac{v \pm v_o}{v} \right)$$

③ Source moving, observer at Rest

$$f_{ap} = f \left(\frac{v}{v \pm v_s} \right)$$

| f_{ap} → Apparent freqⁿ

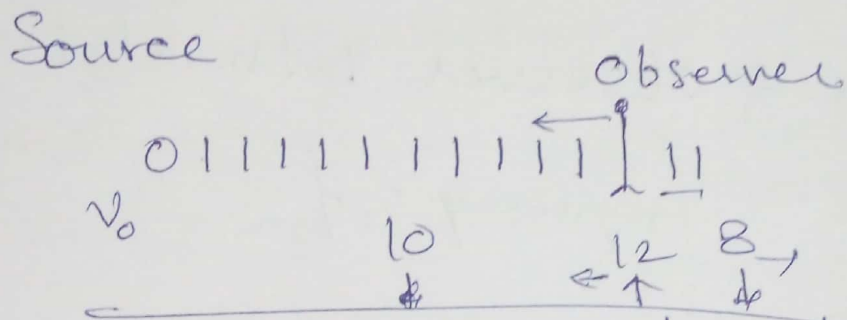
④ Sound & observer both moving

$$f_{ap} = f \left(\frac{v \pm v_o}{v \pm v_s} \right)$$

↳ ② + ③

Doppler's effect

When there is relative motion between source and observer of a wave, the freqⁿ apparent to observer is different than original freqⁿ generated by source. This phenomenon is called 'Doppler's effect'.



→ observer & source coming towards each other
frequency increase. → ←

⇒ If observer & source moving away
frequency decrease ← →

$$v' = \left(\frac{v - v_o}{v - v_s} \right) v_0$$

v_o → velocity of observer
 v_s → velocity of source.
 v → sound velocity.

* Link Budget or Satellite Link Budget! (3)

A link budget is the accounting of all of the gains and losses from the transmitter through the communication channel to the receiver in a communication system.

Link budget Eqⁿ:-

$$\underline{(P_r)} \text{ Received Power }^{(dBm)} = \text{Transmitted Power } (P_t)^{(dBm)} + \text{Gain (dB)} - \text{Losses (dB)}$$

* Basic Friis Transmission Equation:-

The Friis transmission equation is a relation between the power received by the receiving antenna and the power input to the transmitting antenna at a given frequency and a given separation distance between these two antennas.

Friis Transmission Equation

$$\boxed{\frac{P_r}{P_t} = G_t G_r \left(\frac{\lambda}{4\pi R} \right)^2}$$

$R \rightarrow$ Distance between the Antenna.

$P_r \rightarrow$ Power Received by Receiving Antenna.

$P_t \rightarrow$ Power Input to the Transmitting Antenna.

$G_t G_r \rightarrow$ Gain of transmitting & receiving Antenna.