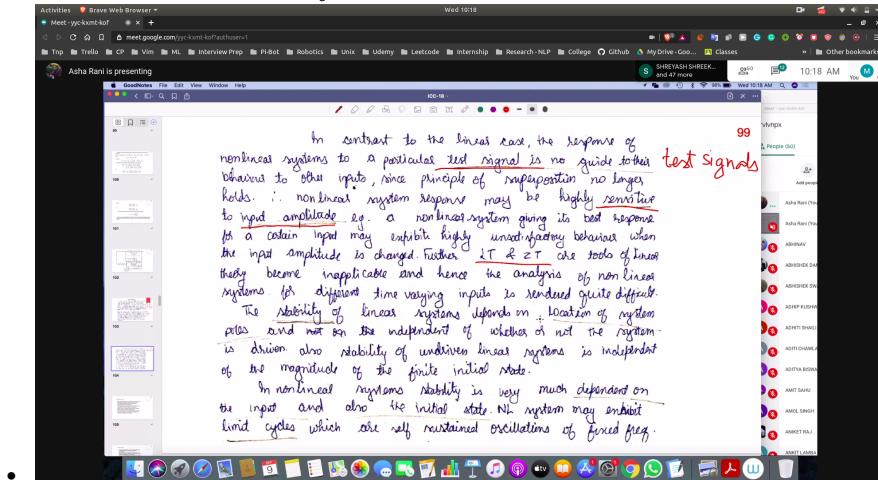


Non Linear Systems

-> For eg in RC ckt (If R is changing and C is changing then the system is non linear) ## Advantages - **good operation**

Intro

- In linear signals we used to test with test signals
- But cannot be done with the non-linear system as it does not follows superposition
- non linear system are highly sensitive of highly sensitive to input amplitude
- stability is not defined by system poles
 - stability also depends on initial state
- It also **exhibits limit cycles** → self sustained oscillations



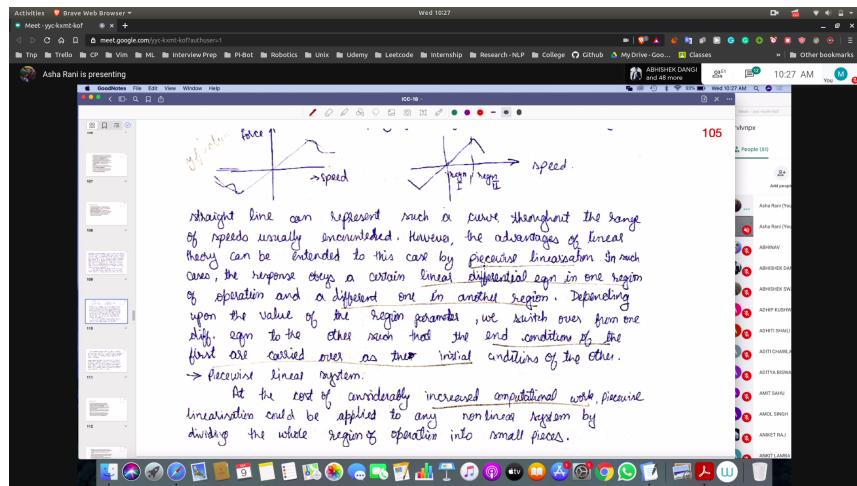
Terms → To be Seen

- Jump Resonance
- SubHarmonic Oscillation
- Limit Cycles
- Asynchronous Quenching

Classification

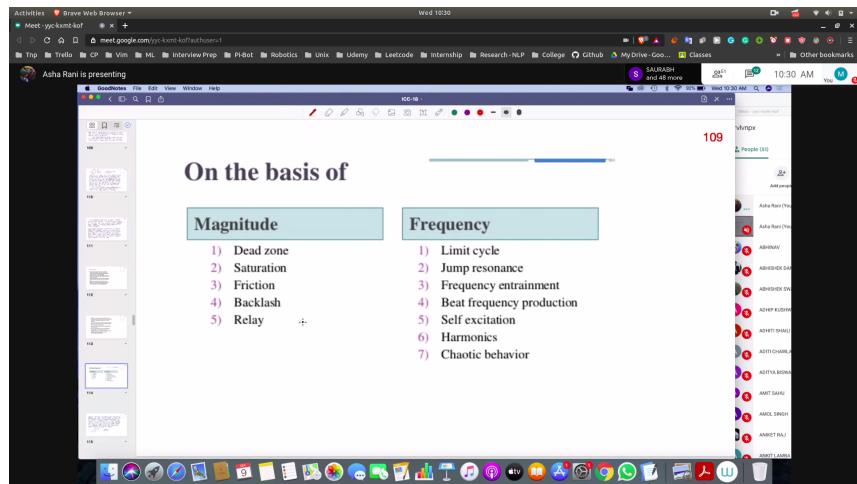
- Incidental Non Linearities
 - inherently present in the system
- Intentional Non Linearities
 - deliberately inserted into the system to modify

Investigation of non-linear system

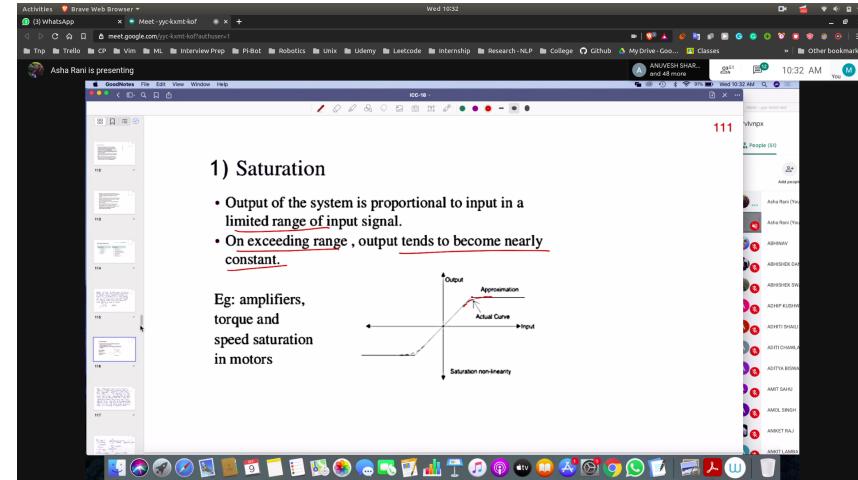


- We linearise the non-linear system
- In order to approximate the curve we will **piecewise linearize** the curve

Different Type of Non- Linearities

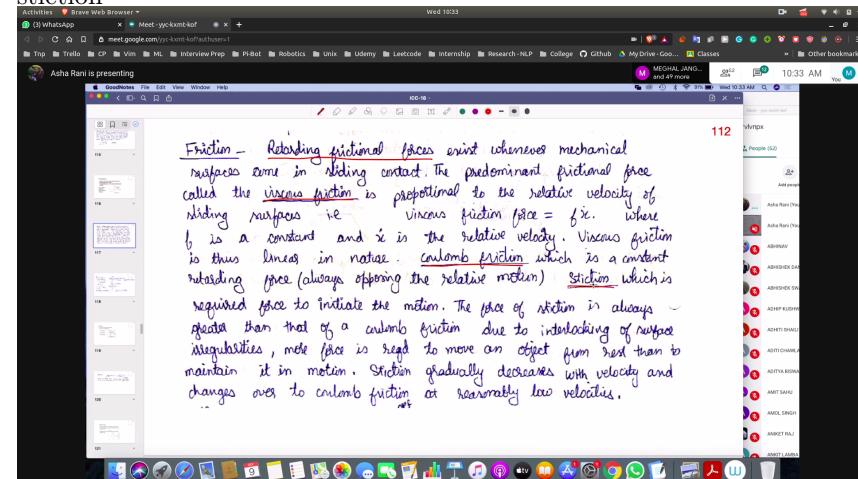


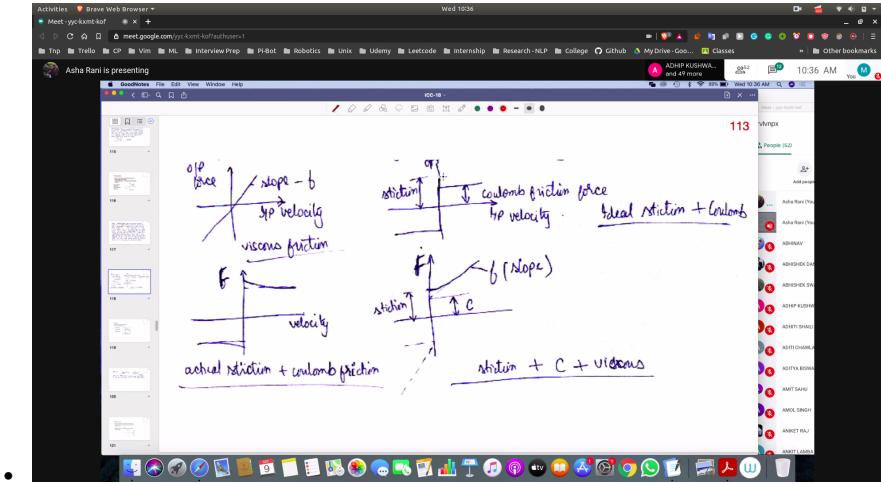
Saturation



Friction

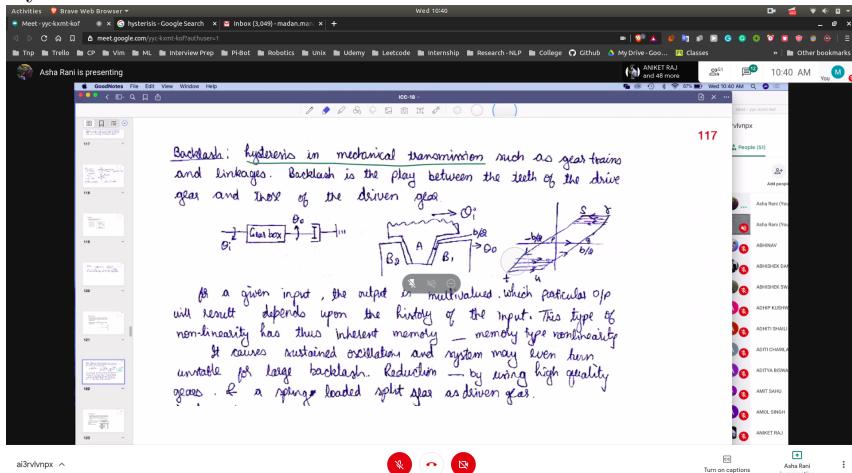
- viscous friction
- coulomb friction
- stiction

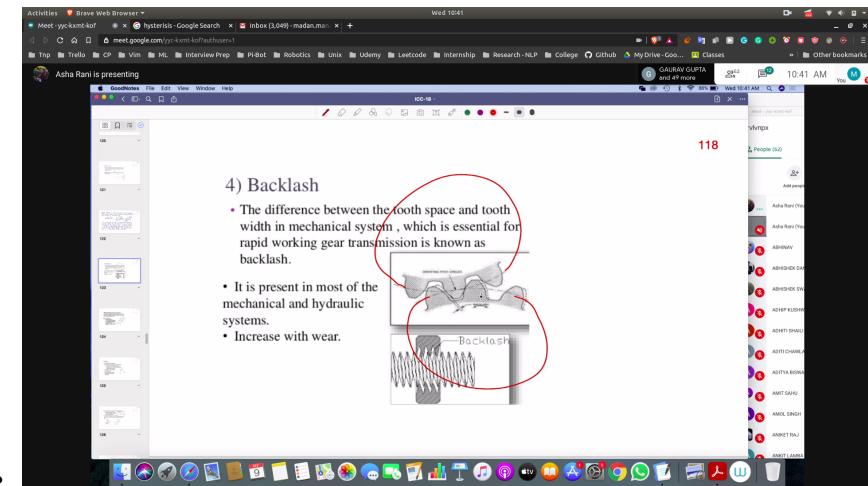




Backlash

- Hysteresis in mechanical transmission





Deadzone