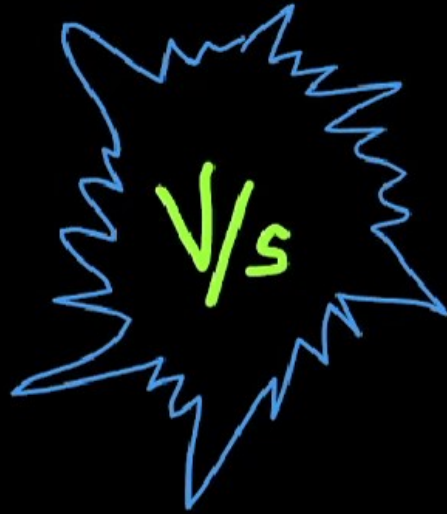


\bar{P}

\bar{Q}



Ins. P

Ins. Q

Instantaneous power eqn

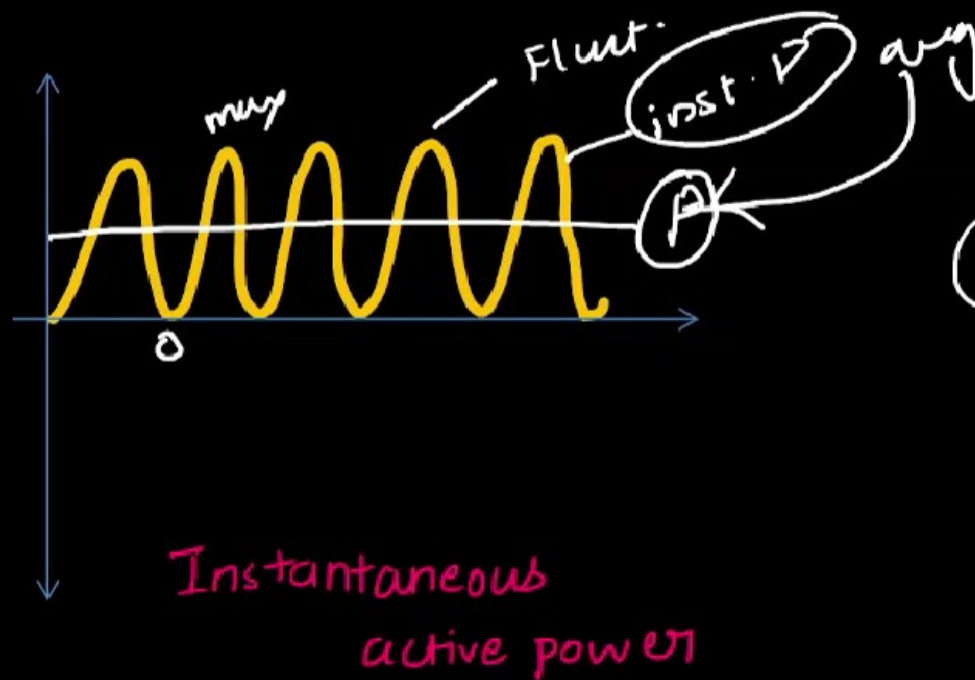
$$p = P + p$$
$$p = VI \cos \phi (1 - \cos 2\omega t) + VI \sin \phi \sin 2\omega t$$

Instantaneous power

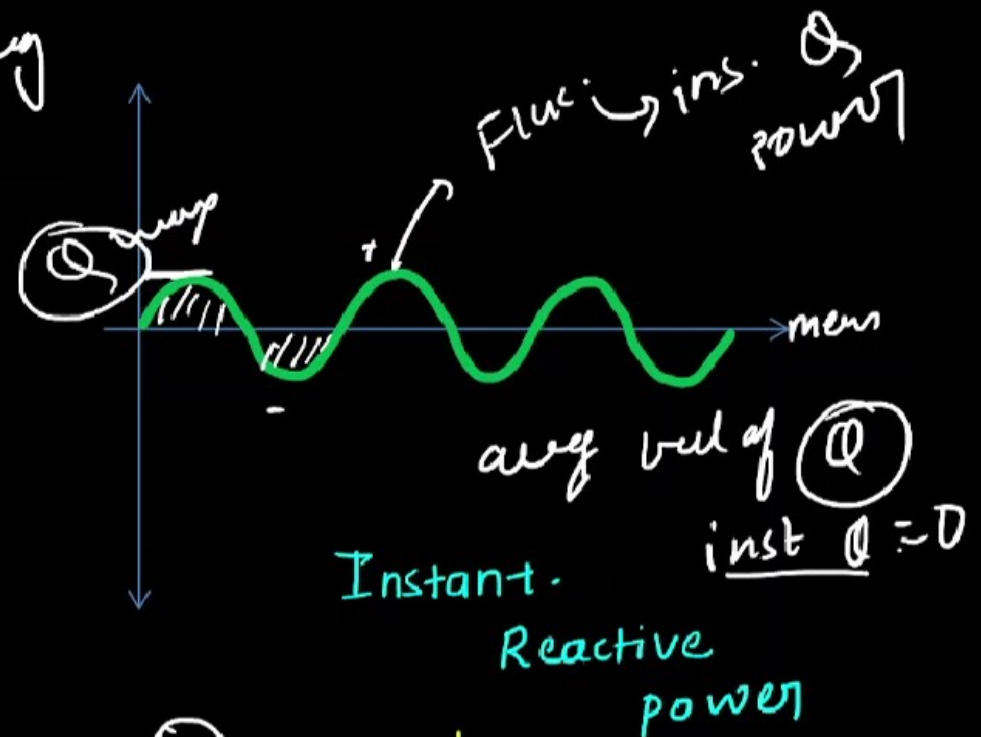
Instantaneous active power

Instantaneous reactive power

$$I_{ns. Power} = I_{ns. act} + I_{ns. react}$$



\downarrow avg. value
 \textcircled{P} avg. of inst. P
 $\underline{\underline{Ac P}}$ Active power



\downarrow Max^m value
 \textcircled{Q} max^m of inst. Q power
Reactive power

INSTANT Vs NORMAL

Instant P

Instant Q

Load
fix

Load
fix

var

avg

Active Power

Reactive Power

↓
fluctuating

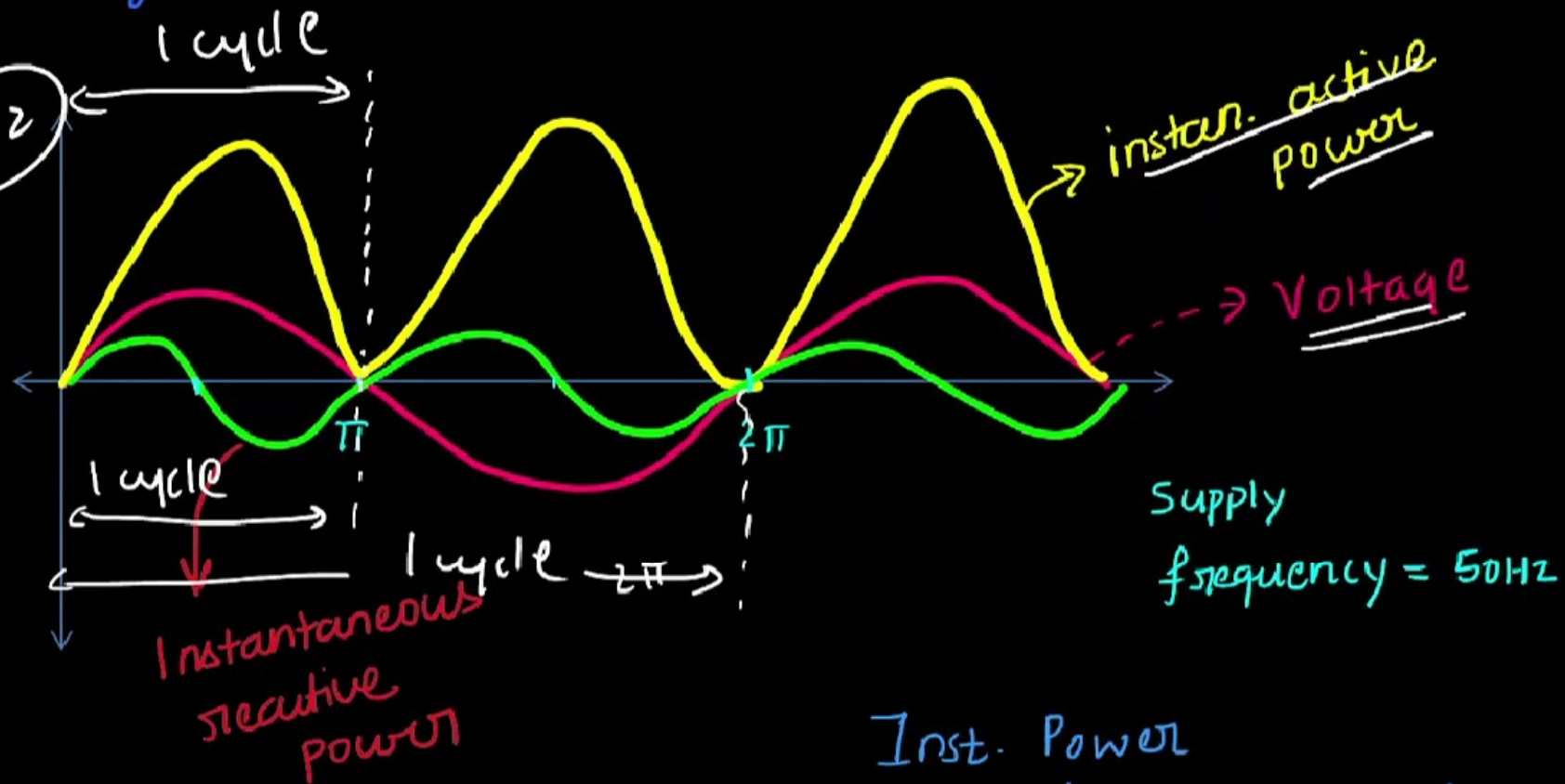
↓
Have frequency

↓
Constant

↓
No frequency



inst a
1m R $(T=T)$
↓
1 cycle $= \pi$
 $V \rightarrow 2\pi$



mathematically

$$\text{Supply volt} = V_m \sin \omega t$$

supply frequency

$$\text{Ins. Active power} = VI \cos \phi (1 - \cos 2\omega t)$$

Ins. $\frac{\text{active power}}{\text{freq}}$

$$\text{Ins. Reactive pow} = VI \sin \phi \sin 2\omega t$$

Ins. $\frac{\text{Reactive power}}{\text{frequency}}$

$$\text{Ins. Power} = 2$$

$$\text{Instan. power freq.} = 2 \times \text{Supply freq.}$$