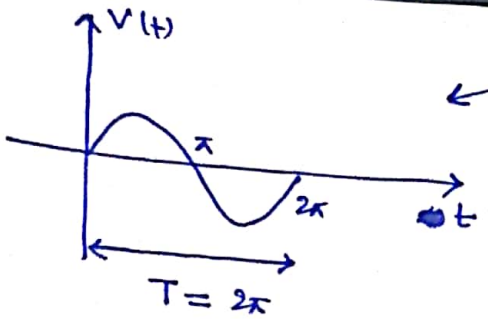
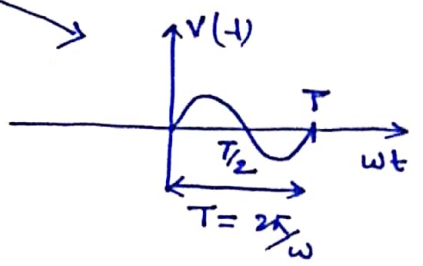


$V(t) = \sin t$ $\quad \because \omega = 1$

$T = \frac{2\pi}{\omega} = T = 2\pi$

$V(t) = \sin \omega t$

$T = \frac{2\pi}{\omega}$



$$V_{rms}^2 = \frac{1}{T}\int_0^T V_m^2 \sin^2 t \, dt$$

$$= \frac{V_m^2}{T}\int_0^T \frac{1-\cos 2t}{2} \, dt$$

$$= \frac{V_m^2}{T}\int_0^T \frac{1}{2} dt - \int_0^T \frac{\cos 2t}{2} dt$$

$$= \frac{V_m^2}{T}\left[\left(\frac{t}{2}\right)_0^T - \left(\frac{\sin 2t}{4}\right)_0^T \right]$$

$$= \frac{V_m^2}{T}\left[\left(\frac{T}{2} - 0\right) - \left(\frac{\sin 2T}{4} - \sin 0\right) \right]$$

($T = 2\pi$, $\sin 0 = 0$)

$$= \frac{V_m^2}{T}\cdot\frac{T}{2} = \frac{V_m^2}{2}$$

$$= \frac{V_m}{\sqrt{2}}$$

$$V_{rms}^2 = \frac{1}{T}\int_0^T V_m^2 \sin^2 \omega t \, d\omega t$$

$$= \frac{V_m^2}{T}\int_0^T \frac{1-\cos 2\omega t}{2} \, d\omega t$$

$$= \frac{V_m^2}{T}\int_0^T \frac{1}{2} d\omega t - \int_0^T \frac{\cos 2\omega t}{2} d\omega t$$

$$= \frac{V_m^2}{T}\left[\left(\frac{\omega t}{2}\right)_0^T - \left(\frac{\sin 2\omega t}{4}\right)_0^T \right]$$

$$= \frac{V_m^2}{T}\left[\left(\frac{T}{2} - 0\right) - \left(\frac{\sin 2T}{4} - 0\right) \right]$$

($\sin 2T = 0$, $0 = 0$)

$$V_{rms}^2 = \frac{V_m^2}{T}\cdot\frac{T}{2} = \frac{V_m^2}{2}$$

$$V_{rms} = \frac{V_m}{\sqrt{2}}$$