20:25

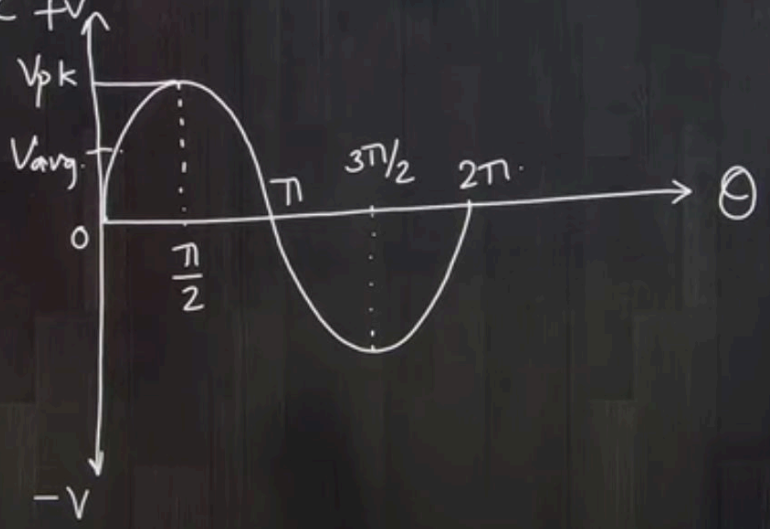
AC Circuits.

Sinusoidal wave.

$V(\theta) = V_{pk} \cdot \sin\theta$

- Trigonometric

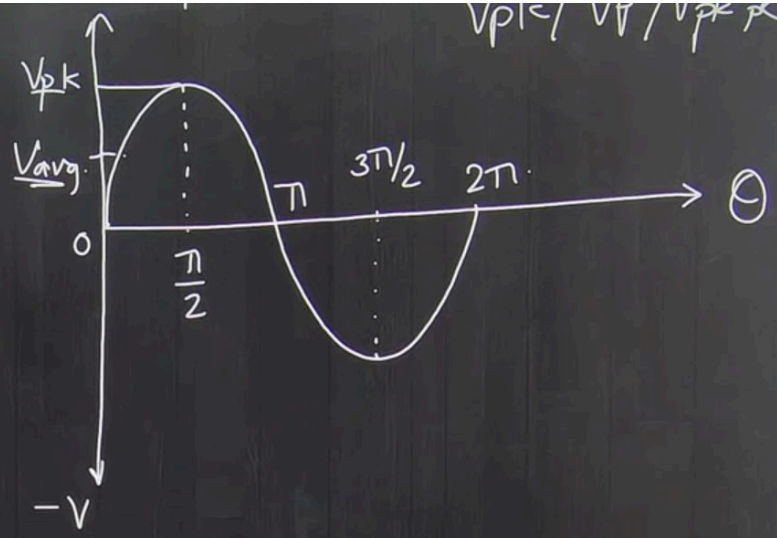
Voltage.



Vpk / Vp / Vpk-pk

View key concept

- Trigonometric +v



Voltage

$$V_{avg} = \frac{1}{\frac{\pi}{2}} \int_0^{\pi/2} V_{pk} \cdot \sin\theta \cdot d\theta$$

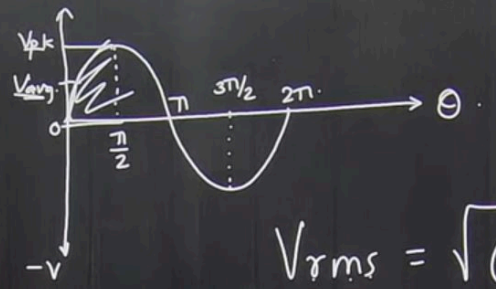
$$= \frac{2}{\pi} V_{pk} \left[-\cos\theta \right]_0^{\pi/2}$$

$$= \frac{2}{\pi} V_{pk} \left[-\cos\frac{\pi}{2} - (-\cos 0) \right]$$

$$= \frac{2}{\pi} V_{pk} \left[0 + 1 \right]$$

$$V_{avg} = \frac{2}{\pi} V_{pk} = 0.636\, V_{pk}$$

- Trigonometric +v



Voltage

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$$= \frac{2}{\pi} V_{pk} \left[0 + 1 \right]$$

$$V_{avg} = \frac{2}{\pi} V_{pk} = 0.636\, V_{pk}$$

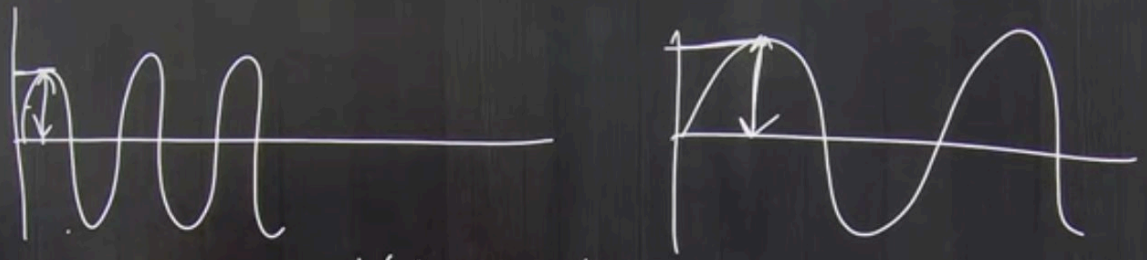
$$V_{rms} = \sqrt{(V_{avg})^2}$$

root mean square

$$= \sqrt{\left(\frac{1}{\pi/2} \int_0^{\pi/2} V_{pk} \cdot \sin\theta \, d\theta \right)^2}$$

$$V_{rms} = \frac{1}{\sqrt{2}} V_{pk}$$

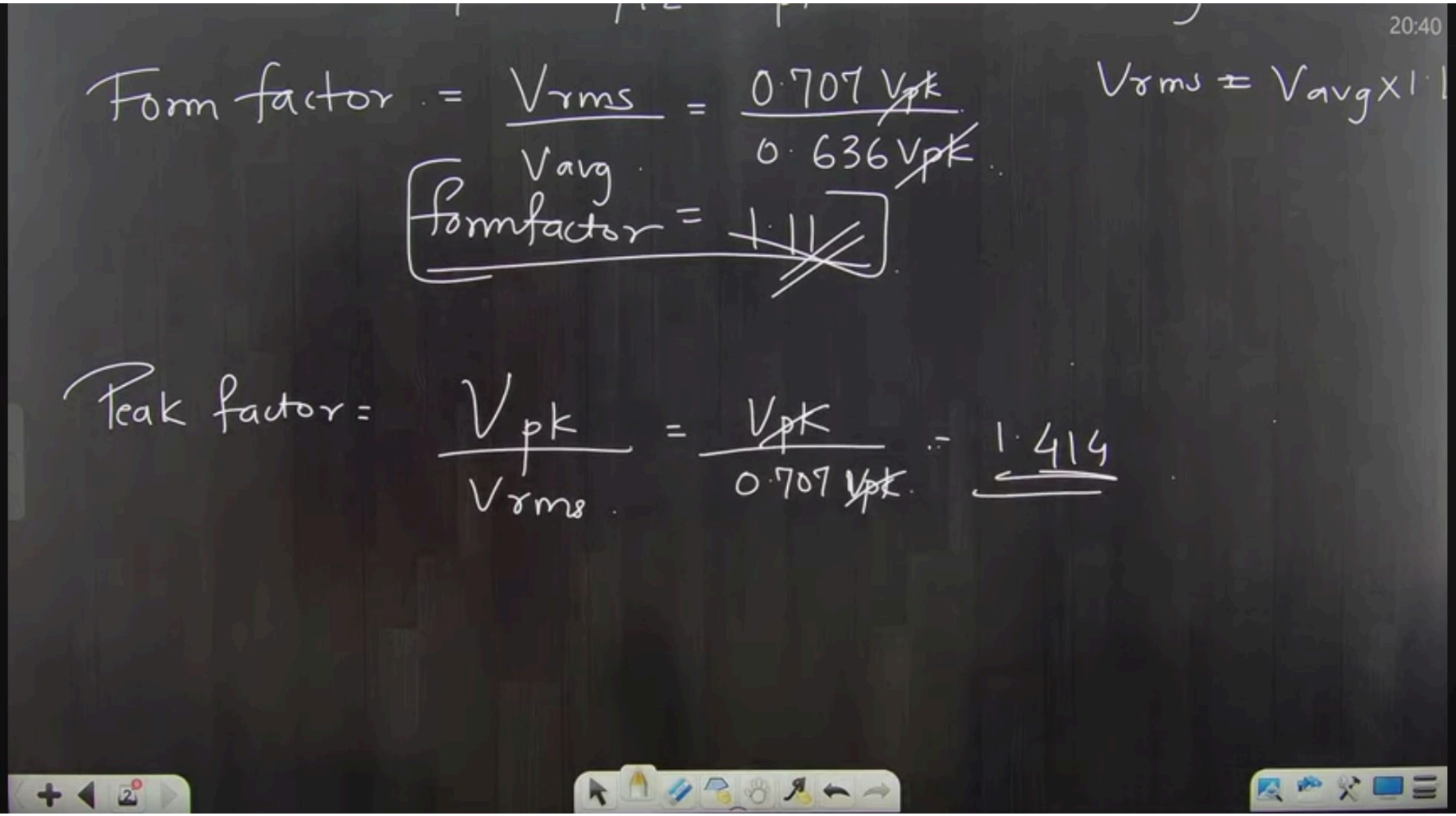
$$V_{rms} = 0.707\, V_{pk}$$



$V_{pk_1} = V_{pk_2} = V_{pk}$

$$\text{Form factor} = \frac{V_{rms}}{V_{avg}} = \frac{0.707\,V_{pk}}{0.636\,V_{pk}}$$

$$\text{formfactor} = 1.11$$


20:40
Form factor = Vrms / Vavg = 0.707 Vpk / 0.636 Vpk
Vrms = Vavg x 1.1
formfactor = 1.11
Peak factor = Vpk / Vrms = Vpk / 0.707 Vpk = 1.414