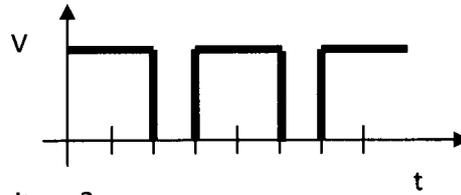


A periodic square wave with a period of 3 seconds is given by the following function as shown:

$$V(t) = \begin{cases} 5\text{v} & 0\text{sec} \leq t \leq 2\text{sec} \\ 0 & 2\text{sec} < t \leq 3\text{sec} \end{cases}$$



What is the root mean square value of the voltage?

a. $V^2(t) = \begin{cases} 25\text{v}^2 & 0\text{sec} \leq t \leq 2\text{sec} \\ 0 & 2\text{sec} < t \leq 3\text{sec} \end{cases}$

b. $\langle V^2(t) \rangle = \frac{1}{T} \int_0^T V^2(t) dt = \frac{1}{3} \left[\int_0^2 (25\text{v}^2) dt + \int_2^3 0 dt \right] = \frac{1}{3\text{s}} (25\text{v}^2) 2\text{s} = \frac{50\text{v}^2}{3}$

c. $V_{\text{rms}} = \sqrt{\langle V^2(t) \rangle} = \sqrt{\frac{50\text{v}^2}{3}} = 4.1\text{v}$