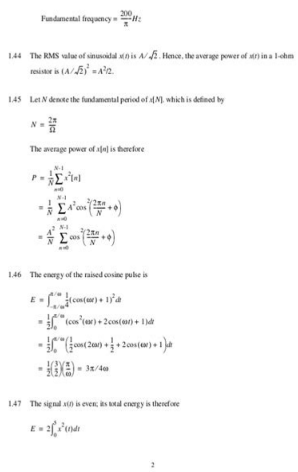

Fundamental frequency $= \frac{200}{\pi} Hz$

1.44 The RMS value of sinusoidal $x(t)$ is $A/\sqrt{2}$. Hence, the average power of $x(t)$ in a 1-ohm resistor is $(A/\sqrt{2})^2 = A^2/2$.

1.45 Let N denote the fundamental period of $x[N]$, which is defined by

$$N = \frac{2\pi}{\Omega}$$

The average power of $x[n]$ is therefore

$$P = \frac{1}{N}\sum_{n=0}^{N-1} x^2[n] = \frac{1}{N}\sum_{n=0}^{N-1} A^2\cos^2\left(\frac{2\pi n}{N}+\phi\right) = \frac{A^2}{N}\sum_{n=0}^{N-1}\cos^2\left(\frac{2\pi n}{N}+\phi\right)$$

1.46 The energy of the raised cosine pulse is

$$E = \int_{-\pi/\omega}^{\pi/\omega}\frac{1}{4}(\cos(\omega t)+1)^2 dt = \frac{1}{2}\int_0^{\pi/\omega}(\cos^2(\omega t)+2\cos(\omega t)+1)dt = \frac{1}{2}\int_0^{\pi/\omega}\left(\frac{1}{2}\cos(2\omega t)+\frac{1}{2}+2\cos(\omega t)+1\right)dt = \frac{1}{2}\left(\frac{3}{2}\right)\left(\frac{\pi}{\omega}\right) = 3\pi/4\omega$$

1.47 The signal $x(t)$ is even; its total energy is therefore

$$E = 2\int_0^5 x^2(t)dt$$

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