

$$z = \frac{1}{1+j} = \frac{1}{2} - \frac{j}{2} \quad -\frac{1}{2}$$

3.) What is the value of $\sum_{i=0}^{\infty} \left(\frac{1}{4}\right)^i = \frac{1 - \frac{1}{4}}{1 - \frac{1}{4}} = \frac{4}{3} = 1.333$

4.) What is the power of the signal

$$V = \sin(2\pi t) + \cos(8\pi t)$$

Period $T = \frac{2\pi}{2\pi} = 1$
 Period $T = \frac{2\pi}{8\pi} = \frac{1}{4}$

$$X(t) = \left[\lim_{T \rightarrow \infty} \frac{1}{2T} \right] \int_{-T}^T |X(t)|^2 dt$$

$$V_1 = \left[\lim_{T \rightarrow \infty} \frac{1}{2T} \right] \int_{-1}^1 \sin^2(2\pi t) dt = \frac{1}{2} \left(\frac{t}{2} - \frac{1}{8\pi} \sin(4\pi t) \right) \Big|_{-1}^1 = \frac{1}{2} \cdot 1 = \frac{1}{2}$$

$$V_2 = 2 \int_{-\frac{1}{4}}^{\frac{1}{4}} \cos^2(8\pi t) dt = 2 \left(\frac{t}{2} + \frac{1}{32\pi} \sin(16\pi t) \right) \Big|_{-0.25}^{0.25} = 0.5 \quad V = 1$$

5.) $\frac{1}{2} + \frac{1}{2} = 1$ $\frac{1}{2} + \frac{1}{2} = 1$ $1 + 1 = 2$

6.) Is the following signal periodic $V = 3\sin(6\pi t) + 4\cos(3\pi t) - \sin(t)$

7.)

$$y = \sin(2\pi t) + \cos(8\pi t)$$

$$T = 1$$

$$T = \frac{1}{4} \quad T = \frac{2\pi}{b}$$

Power

$$X(t) = \left[\lim_{T \rightarrow \infty} \frac{1}{2T} \right] \int_{-T}^T |X(t)|^2 dt$$

$$y_1 = \left[\lim_{T \rightarrow \infty} \frac{1}{2} \right] \int_{-1}^1 |\sin(2\pi t)|^2 dt =$$

$$= \left[\frac{t}{2} - \frac{\sin(2(2\pi)t)}{4(2\pi)} \right]_{-1}^1 = \left[\frac{t}{2} - \frac{\sin(4\pi t)}{8\pi} \right]_{-1}^1$$

$$y_1 = \frac{1}{2} \left[\frac{t}{2} - \frac{\sin(4\pi t)}{8\pi} \right]_{-1}^1 = \frac{1}{2} \cdot 1 = \frac{1}{2}$$

$$y_2 = \left[\lim_{T \rightarrow \infty} 2 \right] \int_{-\frac{1}{4}}^{\frac{1}{4}} |\cos(8\pi t)|^2 dt$$

2

$$y_2 = 2 \cdot 0.25 = \frac{1}{2}$$

$$y_{\text{pow}} = \frac{1}{2} + \frac{1}{2} = 1$$