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GATE 2023 IN 29

EE23BTECH11065 - prem sagar

Question:

Let y(t)=x(4t), where x(t) is a continous-time periodic signal of 100s.the fundamental period of y(t) is (**rounded off to the nearest integer**) (GATE IN 29)

Solution:

Symbol	Value	Description
T	100	fundamental period of $x(t)$
T_1		fundamental period of $y(t)$
ω_0	$\frac{8\pi}{100}$	fundamental frequency of $y(t)$

TABLE 1 INPUT PARAMETERS

From Table 1 Applying Fourier series:

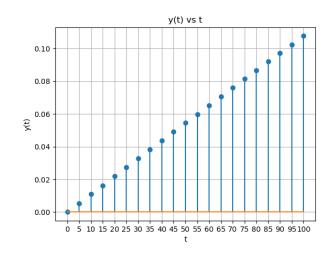
$$x(t) = \sum_{n=-\infty}^{\infty} c_n e^{\frac{j 2\pi n t}{100}}$$
 (1)

$$y(t) = x(4t) \tag{2}$$

$$y(t) = \sum_{n = -\infty}^{\infty} c_n e^{\frac{j 2\pi n \, (4t)}{100}}$$
 (3)

$$=\sum_{n=-\infty}^{\infty}c_n e^{\frac{j2\pi nt}{25}} \tag{4}$$

$$T_1 = 25 \text{sec}$$



(5) Fig. 1. plot y(t) v/s t