GATE 2021 EC

EE:1205 Signals and systems
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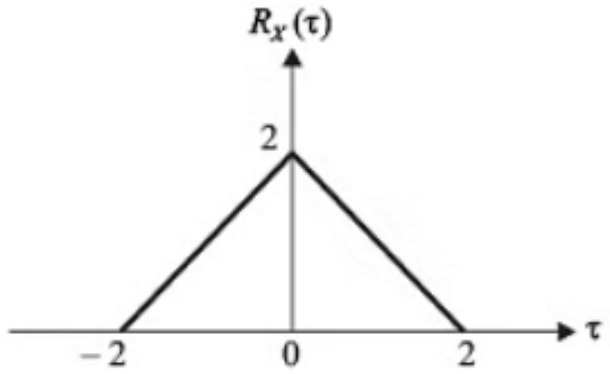
Question 47:
The autocorrelation function $R_x(\tau)$ of a wide-sense stationary random process $X(t)$ is shown in the figure. The average power of $X(t)$ is ?



Solution: Here $R_x(0) = 2$

Parameter	Description
$R_x(\tau)$	Autocorrelation function
$X(t)$	Stationary random process
P_x	Average power

TABLE 0
VALUES

Average power of X(t) is given as mean square value of X(t), i.e.

$$P_x = \int_{-\infty}^{\infty} |X^2(t)| \tag{1}$$

$$R_x(\tau) = \int_{-\infty}^{\infty} X(t)\, X(t-\tau)\, dt \tag{2}$$

From equations (1) and (2)

$$P_x = R_x(0) \tag{3}$$

$$\implies P_x = 2W \tag{4}$$