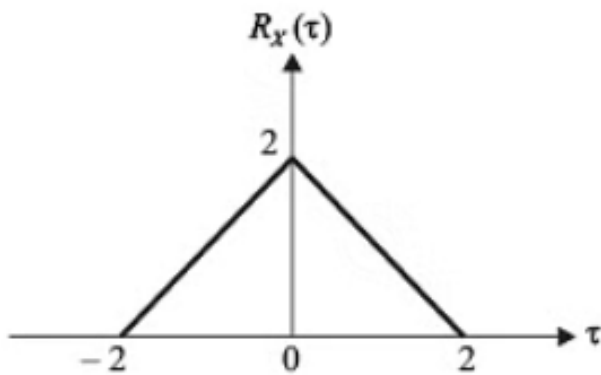# Assignment-3

EE:1205 Signals and systems
Indian Institute of Technology, Hyderabad

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EE23BTECH11221

I. QUESTION 1.2.4

The autocorrection factor 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 ?

II. SOLUTION

Here $R_x(\tau = 0) = 2$

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

$$P_x = E\left[X^2(t)\right] = E[X(t)X(t)] \qquad (1)$$

Autocorrelation function of $X(t)$ is defined as:

$$R_x(\tau) = E[X(t)X(t+\tau)] \qquad (2)$$
$$R_x(\tau = 0) = E[X(t)X(t+0)] \qquad (3)$$
$$R_x(0) = E[X(t)X(t)] \qquad (4)$$

From equations (1) and (3)

$$\implies P_x = R_x(0) = 2W \qquad (5)$$
$$(6)$$

Hence the average power of the system is 2 W