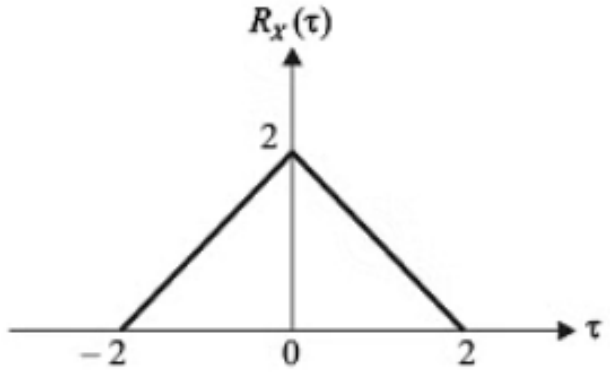
GATE 2021 EC

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

Sai Preetam Umesh Sasankota
EE23BTECH11221

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

Power spectral density of a wide sense stationary process is a positive real function.

It is related to Auto co-relation function $R_x(t)$ by the fourier transform:

$$R_x(\tau) \overset{\mathcal{F}}{\leftrightarrow} S_x(f) \tag{1}$$

For wide-sense stationary random process , the power of a signal is given by $R_x(0)$

$$R_x(0) = 2 \tag{2}$$
$$\implies P_x = 2W \tag{3}$$