GATE Assignment 4

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Download all latex codes from

https://github.com/AI20BTECH11014/EE3900-Linear-Systems-and-Signal-processing/blob/main/Gate_Assignment_4/Gate_Assignment_4.tex

1 GATE EC-1991 Q.1.31

A signal has frequency components from 300 HZ to 1.8 KHZ. The minimum possible rate at which the signal has to be sampled is

Solution

Given,

$$f_H = 1800Hz \tag{1.0.1}$$
$$f_L = 300Hz \tag{1.0.2}$$

As it is the case of band pass sampling

$$\text{bandwidth} = f_H - f_L \tag{1.0.3}$$
$$= 1500Hz \tag{1.0.4}$$
$$m = \lfloor \frac{f_H}{BW} \rfloor \tag{1.0.5}$$
$$= 1 \tag{1.0.6}$$
$$(f_s)_{min} = \frac{2f_H}{m} \tag{1.0.7}$$
$$= 3600 samples/sec \tag{1.0.8}$$

$\therefore$ The minimum possible rate is $3600 samples/sec$