

1) Communications.

$$T_s = 100 \text{ ms}$$

The problem is that it does not represent the original signal.

$$\text{At } f_s = 40 \text{ Hz, } T_s = \frac{1}{40} = 25 \text{ ms}$$

~~This is ok because the period is $T_s = 25 \text{ ms}$~~
~~that~~

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~~to~~ $f_m = 10 \text{ Hz}$, and by Nyquist theory we need to sample at $2 \times$ max to get back the original signal.

~~But~~ Thus the limit acceptable ^{sampling} frequency

$$f_s = 20 \text{ Hz}$$

is 0.1 because the period is T_{sample}

is 0.1 because the max frequency is

$f_m = 10 \text{ Hz}$, and by Nyquist theory we need to sample at $2 \times$ max to get back the original signal.

Thus the limit acceptable ^{sampling} frequency

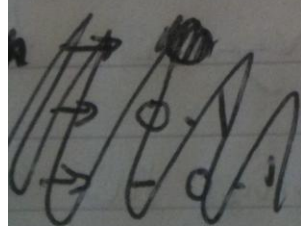
$$f_s = 2 \times f_m = 20 \text{ Hz}$$

20 40 60 80 100 120 140 160 180 200

1) look at picture

$$3) \log_2(N) = K$$

$$\log_2(4) = 2, \text{ so } 2 \text{ bits}$$



$$0 \ 0 \rightarrow 0.1$$

$$0 \ 1 \rightarrow -0.1$$

$$1 \ 0 \rightarrow 0.2$$

$$1 \ 1 \rightarrow -0.2$$

4) we the following bit sequence:

01, 01, 00, 10, 01, 11, 01

And the bit rate is $\frac{u}{T_b} = \frac{2}{25 \times 10^{-3}} = 80$ bits per second.

5) ~~scribbled out~~

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