$$100\text{ms} = 100 \times 10^{-3}\text{s} = 10^{-1}\text{s}$$

$$f = 1/T = 1/(10^{-1})\text{Hz} = 10\text{Hz} = 10 \times 10^{-3}k\text{Hz} = 10^{-2}k\text{Hz}$$

$$1/6 \times 360^\circ = 60^\circ$$

$$1/6 \times 360^\circ = 1/6 \times 2 \times \pi\text{rad} = 1/3\pi\text{rad}$$

$$T(t) = \frac{a_a}{2} + \sum_{n=1}^{\infty}\left[a_n \cos\left(\frac{n\pi t}{L}\right) + b_n \sin\left(\frac{n\pi t}{L}\right)\right]$$

$$\begin{aligned} a_0 &= \frac{1}{L}\int_c^{c+2L} f(t)dt \\ a_n &= \frac{1}{L}\int_c^{c+2L} f(t)\cos\left(\frac{n\pi t}{L}\right)dt \\ b_n &= \frac{1}{L}\int_c^{c+2L} f(t)\sin\left(\frac{n\pi t}{L}\right)dt \end{aligned}$$

$$f(t) = \begin{cases} -1,\ -\pi < t < 0 \\ +1,\ 0 \leq t < +\pi \end{cases}$$

$$\begin{aligned} B_1 &= N/2 \rightsquigarrow B_1 = 1/2 = 500\text{kHz} \\ B_2 &= 3 \times B_1 \rightsquigarrow B_2 = 3 \times 500 = 1,5\text{MHz} \\ B_3 &= 5 \times B_1 \rightsquigarrow B_3 = 5 \times 500 = 2,5\text{MHz} \end{aligned}$$

$$\text{dB} = 10 \times \log\left(\frac{P_2}{P_1}\right)$$

$$\text{dB} = 20 \times \log\left(\frac{V_2}{V_1}\right)$$

$$10 \times \log\left(\frac{P1/2}{P1}\right) = 10 \times \log\left(\frac{1}{2}\right) = 10 \times -0,3 = -3\text{dB}$$

$$-30 = 10 \times \log\left(P_m\right) \rightsquigarrow P_m = 10 \times 10^{-3}\text{mW}$$

$$\begin{aligned} \text{dB} &= 10 \times \log\left(\frac{P_2}{P_1}\right) = -1,5 \\ \frac{P_2}{P_1} &= 10^{-0,15} = 0,71 \\ P_2 &= 0,71 \times P_1 = 0,7 \times 2 = 1,4\text{mW} \end{aligned}$$

$$\text{SNR} = \frac{\text{potência média do sinal}}{\text{potência média do ruído}}$$

$$\text{SNR}_{\text{dB}} = 10 \times \log(\text{SNR})$$

$$\text{SNR} = \frac{10000\mu\text{W}}{1\text{mW}} = 10000$$
$$\text{SNR}_{\text{dB}} = 10\log(10000) = 10\log(10^4) = 40$$

$$\text{Taxa de Transferência} = 2 \times \text{Largura de Banda} \times \log_2(L)$$

$$\text{Capacidade} = \text{Largura de Banda} \times \log_2(1 + \text{SNR})$$

$$\text{Capacidade} = \text{Largura de Banda} \times \log_2(1 + 0) = 0$$

$$\begin{aligned} C &= B \times \log_2(1 + \text{SNR}) \\ &= 10 \times 10^6 \times \log_2(1 + 63) \\ &= 10 \times 10^6 \times \log_2(64) \\ &= 6\text{Mbps} \end{aligned}$$

$$\text{Taxa de Transferência} = 2 \times \text{Largura de Banda} \times \log_2(L)$$

$$6\text{Mbps} = 2 \times 1\text{MHz} \times \log_2(L) \rightsquigarrow L = 8$$

$$\text{Latência} = \text{Tempo de Propagação} + \text{Tempo de Transmissão} + \text{Tempo de Fila} + \text{Retardo de Processamento}$$

$$\text{Tempo de Propagação} = \text{Distância/Velocidade de Propagação}$$

$$2.4 \times 10^8\text{m/s}$$

$$\text{Tempo de Transmissão} = \text{Tamanho da Mensagem/Largura de Banda}$$