Praca domowa

1) k_1: „w czterech rzutach wyrzucono dokładnie trzy razy O"

k_2: „w czterech rzutach wyrzucono dokładnie trzy razy R"

$\bar{\bar{\Omega}} = 2^4 = 16$

$A_{k_1} = \{(0,0,0,R), (0,0,R,0), (0,R,0,0), (R,0,0,0)\}$

$A_{k_2} = \{(R,R,R,0), (R,R,0,R), (R,0,R,R), (0,R,R,R)\}$

$\bar{\bar{A}}_{k_1} = 4 \qquad \bar{\bar{A}}_{k_2} = 4$

$p(A_{k_1}) = p(A_{k_2}) = \frac{4}{16} = \frac{1}{4}$

$k_1 = k_2 = \log_2 \frac{1}{\frac{1}{4}} = \log_2 4 = 2$

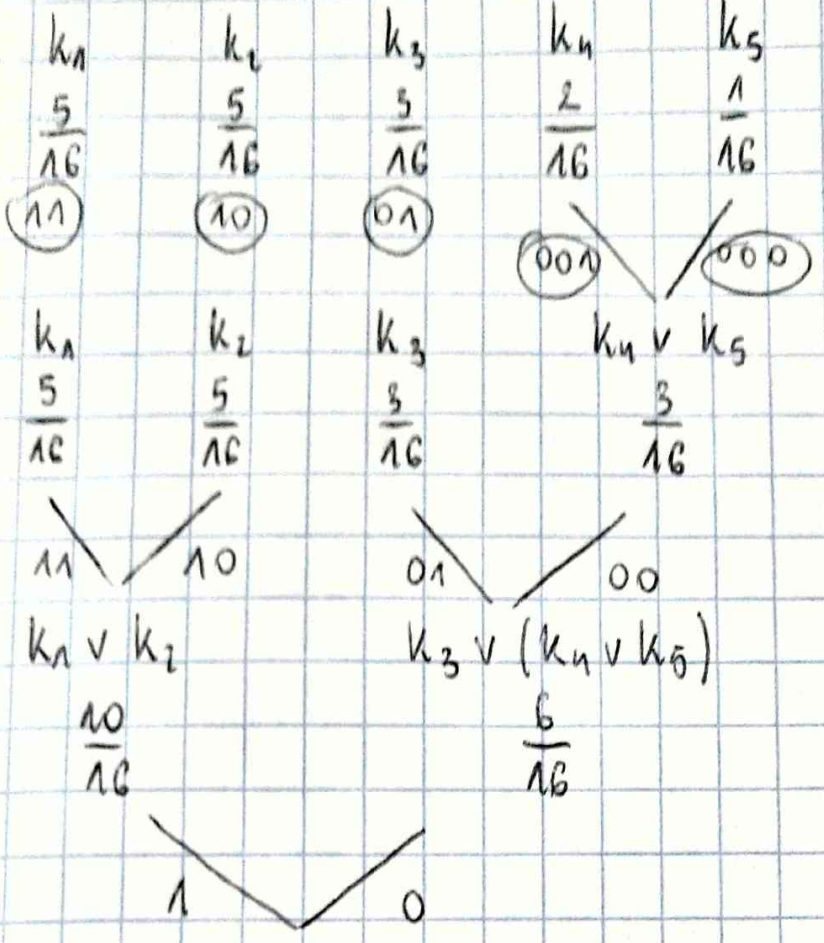
$k_1 = k_2 = 2$ [bity]

2) $n \to 2^n \qquad p_1 = p_2 = \ldots = p_{2^n} = \frac{1}{2^n}$

$H = \sum_{i=1}^{2^n} \frac{1}{2^n} \log_2 \frac{1}{\frac{1}{2^n}} = 2^n \cdot \frac{1}{2^n} \log_2 2^n = n \log_2 2 = n$

$H = n$ [bitów]

3)



k_1 - 11
k_2 - 10
k_3 - 01
k_4 - 001
k_5 - 000

$$H = \sum_{i=1}^{5} p_i \log_2 \frac{1}{p_i} = \left(\frac{5}{16} \log_2 \frac{16}{5}\right) \cdot 2 + \frac{3}{16} \log_2 \frac{16}{3} + \frac{2}{16} \log_2 \frac{16}{2} + \frac{1}{16} \log_2 16 \approx$$

$$\approx \frac{5}{8} \log_2 3{,}2 + \frac{3}{16} \log_2 5{,}33 + \frac{1}{8} \cdot 3 + \frac{1}{16} \cdot 4 = \frac{5}{8} \cdot 1{,}68 + \frac{3}{16} \cdot 2{,}41 + \frac{3}{8} + \frac{1}{4} =$$

$$= 1{,}05 + 0{,}452 + 0{,}375 + 0{,}25 = 2{,}127 \qquad \underline{H \approx 2{,}127}$$

$$L = \sum_{i=1}^{5} p_i N_i = \frac{5}{16} \cdot 2 \cdot 2 + \frac{3}{16} \cdot 2 + \frac{2}{16} \cdot 3 + \frac{1}{16} \cdot 3 = \frac{5}{4} + \frac{3}{8} + \frac{3}{8} + \frac{3}{16} =$$

$$= \frac{20 + 12 + 3}{16} = \frac{35}{16} = 2{,}1875 \qquad \underline{L \approx 2{,}1875}$$

$$R = L - H = 2{,}1875 - 2{,}127 = 0{,}0605 \qquad \underline{R \approx 0{,}0605}$$