



$$\begin{aligned} P(0) &= 0.2 \\ P(1) &= 0.3 \\ P(2) &= 0.5 \end{aligned}$$

Informações condicionadas:

$$I(0|0) = \log\left(\frac{1}{\bar{P}}\right) \quad I(1|0) = \log\left(\frac{1}{P/2}\right) = \log\left(\frac{2}{P}\right)$$

$$I(2|0) = \log\left(\frac{1}{P/2}\right) = \log\left(\frac{2}{P}\right)$$

$$I(0|1) = \log\left(\frac{1}{P/2}\right) = \log\left(\frac{2}{P}\right) \quad I(1|1) = \log\left(\frac{1}{\bar{P}}\right)$$

$$I(2|1) = \log\left(\frac{1}{P/2}\right) = \log\left(\frac{2}{P}\right)$$

$$I(0|2) = \log\left(\frac{1}{P/2}\right) = \log\left(\frac{2}{P}\right) \quad I(1|2) = \log\left(\frac{1}{P/2}\right) = \log\left(\frac{2}{P}\right)$$

$$I(2|2) = \log\left(\frac{1}{\bar{P}}\right)$$

Entropias condicionadas:

$$H(S|0) = \bar{P} \log\left(\frac{1}{\bar{P}}\right) + \frac{P}{2} \log\left(\frac{2}{P}\right) + \frac{P}{2} \log\left(\frac{2}{P}\right)$$

$$= \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right)$$

$$H(S|1) = \frac{P}{2} \log\left(\frac{2}{P}\right) + \bar{P} \log\left(\frac{1}{\bar{P}}\right) + \frac{P}{2} \log\left(\frac{2}{P}\right)$$

$$= \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right)$$

$$H(S|2) = \frac{P}{2} \log\left(\frac{2}{P}\right) + \frac{P}{2} \log\left(\frac{2}{P}\right) + \bar{P} \log\left(\frac{1}{\bar{P}}\right)$$

$$= P \log\left(\frac{2}{P}\right) + \bar{P} \log\left(\frac{1}{\bar{P}}\right)$$

Entropía de la fuente.

$$H(S) = P(0) [H(S|0)] + P(1) [H(S|1)] + P(2) [H(S|2)]$$

$$= P(0) \left[ \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right) \right] + P(1) \left[ \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right) \right] +$$

$$P(2) \left[ \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right) \right]$$

$$= 0.2 \left[ \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right) \right] + 0.3 \left[ \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right) \right] +$$

$$0.5 \left[ \bar{P} \log\left(\frac{1}{\bar{P}}\right) + P \log\left(\frac{2}{P}\right) \right]$$

Assume  $p = 1/3$ 

$$0.2 \left[ (1-p) \log \left( \frac{1}{1-p} \right) + p \log \left( \frac{2}{p} \right) \right] + 0.3 \left[ (1-p) \log \left( \frac{1}{1-p} \right) + p \log \left( \frac{2}{p} \right) \right] +$$
$$0.5 \left[ (1-p) \log \left( \frac{1}{1-p} \right) + p \log \left( \frac{2}{p} \right) \right]$$

$$= \underline{\underline{1.252}}$$