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4- Erinson Barroyo

$S = \{ s_1, s_2 \}$ $\quad P_1 = P(s_1)$

$P_2 = P(s_2)$

$S^2 = \{ \sigma_1, \sigma_2, \sigma_3, \sigma_4 \}$

	i	j
σ_1	0	0
σ_2	0	1
σ_3	1	0
σ_4	1	1

$$P(\sigma_i) = \prod_{j=1}^{2} P_{ij}$$

debido a que la probabilidad de una secuencia de eventos, es la multiplicación de cada probabilidad de cada evento.

$$H(S^2) = \sum_{S^2} \sigma_i \log \left(\frac{1}{P_{i1} P_{i2}} \right)$$

$$2H(S) = 2 \sum_{S^2} P_i \log \left(\frac{1}{P_i} \right)$$

$$= \sigma_1 \log \left(\frac{1}{P(\sigma_1)} \right) + \sigma_2 \log \left(\frac{1}{P(\sigma_2)} \right) + \sigma_3 \log \left(\frac{1}{P(\sigma_3)} \right) + \sigma_4 \log \left(\frac{1}{P(\sigma_4)} \right)$$

$$P_1 P_1 \log \left(\frac{1}{P_1 P_1} \right) + P_1 P_2 \log \left(\frac{1}{P_1 P_2} \right) + P_2 P_1 \log \left(\frac{1}{P_2 P_1} \right) + P_2 P_2 \log \left(\frac{1}{P_2 P_2} \right)$$

$$P_1 P_1 \left[\log \left(\frac{1}{P_1} \right) + \log \left(\frac{1}{P_1} \right) \right] + P_1 P_2 \left[\log \left(\frac{1}{P_1} \right) + \log \left(\frac{1}{P_2} \right) \right] + P_2 P_1 \left[\log \left(\frac{1}{P_1} \right) + \log \right.$$

$$+ P_2 P_2 \left[\log \left(\frac{1}{P_2} \right) + \log \left(\frac{1}{P_2} \right) \right]$$

Escaneado con CamScanner

$$\log\left(\frac{1}{P_1}\right)\left[P_1P_1 + P_1P_2 + P_1P_2 + P_2P_1\right] + \log\left(\frac{1}{P_2}\right)\left[P_1P_2 + P_2P_1 + P_2P_2 + P_2P_2\right]$$

$$\log\left(\frac{1}{P_1}\right)\left[P_1\,\underbrace{(P_1 + P_1 + P_2 + P_2)}_{2}\right] + \log\left(\frac{1}{P_2}\right)\left[P_2\,\underbrace{(P_1 + P_1 + P_2 + P_2)}_{2}\right]$$

$$2P_1 \log\left(\frac{1}{P_1}\right) + 2P_2 \log\left(\frac{1}{P_2}\right)$$

$$2\left[P_1 \log\left(\frac{1}{P_1}\right) + P_2 \log\left(\frac{1}{P_2}\right)\right]$$

$$2\sum_{S} P_i \log\left(\frac{1}{P_i}\right) = 2H(S)$$