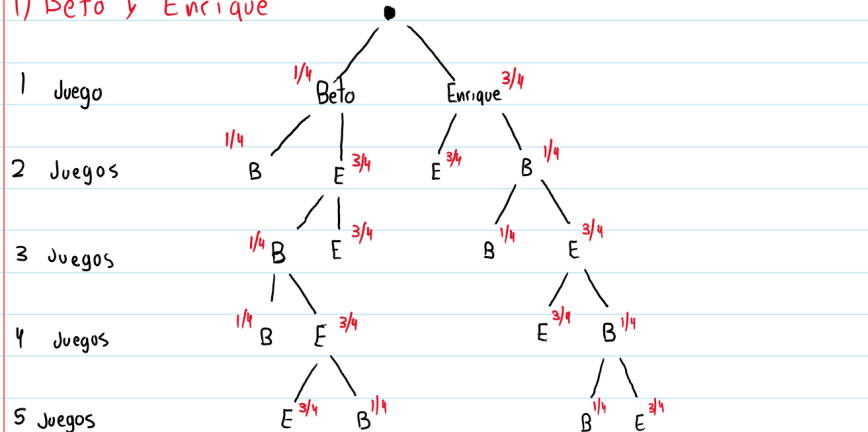1. La variable discreta: Unos problemillas



1) Beto y Enrique

$$P(\text{Beto gana}) = \left(\frac{1}{4}\cdot\frac{1}{4}\right) + \left(\frac{1}{4}\cdot\frac{3}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\right) + \left(\frac{1}{4}\cdot\frac{3}{4}\cdot\frac{1}{4}\cdot\frac{3}{4}\cdot\frac{1}{4}\right) +$$
$$\left(\frac{3}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\right) + \left(\frac{3}{4}\cdot\frac{1}{4}\cdot\frac{3}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\right)$$
$$= 0.1386$$
$$P(\text{Partidos Esperados}) = 2.6328$$

| X | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
|  | 1/4*1/4+3/4*3/4 | 1/4*3/4*3/4+3/4*1/4*1/4 | 1/4*3/4*1/4*1/4+3/4*1/4*3/4*3/4 | 1/4*3/4*1/4*3/4*1/4+1/4*3/4*1/4*3/4*3/4+3/4*1/4*3/4*1/4*3/4+3/4*1/4*3/4*1/4*1/4 |
| P | 0.6250 | 0.1875 | 0.1171875 | 0.0703125 |
| x*P(x) | 1.2500 | 0.5625 | 0.4688 | 0.3516 |
| E|P(X)| | 2.6328 | | | |

2) 4 Cruces

$$P(X \geq 2) = 1 - (P(x=0) + P(x=1))$$

$$P(X=0) = \binom{4}{0}(0.1)^0(0.9)^4$$
$$P(X=1) = \binom{4}{1}(0.1)^1(0.9)^3$$

$$P(X \geq 2) = 1 - [(0.9)^4 + 4 \times 0.1 \times (0.9)^3]$$
$$= 0.0523$$

2 Cruces

$$P(X \geq 1) = 1 - P(x=0)$$
$$P(x=0) = \binom{2}{0}(0.1)^0(0.9)^2$$
$$P(X \geq 1) = 1 - (0.9)^2$$
$$P(X \geq 1) = 0.19$$

## 3) Las revistas

3 Ejemplares

$x = 1, 2, 3$

$I_3(x) = 4x - 2 \times 3 = 4x - 6$

$x \geq 3$

$I_3(x) = 4 \times 3 - 2 \times 3 = 12 - 6 = 6$

$$E[I_3(x)] = \sum_{x=1}^{6} P(x) \cdot I_3(x)$$

$P(x=1) = \frac{1}{15}$, $\quad I_3(1) = 4 \times 1 - 6 = -2$

$P(x=2) = \frac{2}{15}$, $\quad I_3(2) = 4 \times 2 - 6 = 2$

$P(x=3) = \frac{3}{15}$, $\quad I_3(3) = 4 \times 3 - 6 = 6$

$P(x=4) = \frac{4}{15}$, $\quad I_3(4) = 6$

$P(x=5) = \frac{3}{15}$, $\quad I_3(5) = 6$

$P(x=6) = \frac{2}{15}$, $\quad I_3(6) = 6$

$E[I_3(x)] = \left(\frac{1}{15} \times (-2)\right) + \left(\frac{2}{15} \times 2\right) + \left(\frac{3}{15} \times 6\right) + \left(\frac{4}{15} \times 6\right) + \left(\frac{3}{15} \times 6\right) + \left(\frac{2}{15} \times 6\right)$

$= -\frac{2}{15} + \frac{4}{15} + \frac{18}{15} + \frac{24}{15} + \frac{18}{15} + \frac{12}{15}$

$= \frac{74}{15}$

$= 4.93$

## 4 Ejemplares

$I_4(x) = 4x - 2 \times 4 = 4x - 8$

$x = 1, 2, 3, 4$

$I_4(x) = 4 \times 4 - 2 \times 4 = 16 - 8 = 8$

$x > 4$

$$E[I_4(x)] = \sum_{x=1}^{6} P(x) \cdot I_4(x)$$

$P(x=1) = \frac{1}{15}$, $\quad I_4(1) = 4 \times 1 - 8 = -4$

$P(x=2) = \frac{2}{15}$, $\quad I_4(2) = 4 \times 2 - 8 = 0$

$P(x=3) = \frac{3}{15}$, $\quad I_4(3) = 4 \times 3 - 8 = 4$

$P(x=4) = \frac{4}{15}$, $\quad I_4(4) = 4 \times 4 - 8 = 8$

$P(x=5) = \frac{3}{15}$, $\quad I_4(5) = 8$

$P(x=6) = \frac{2}{15}$, $\quad I_4(6) = 8$

$E[I_4(x)] = \left(\frac{1}{15} \times (-4)\right) + \left(\frac{2}{15} \times 0\right) + \left(\frac{3}{15} \times 4\right) + \left(\frac{4}{15} \times 8\right) + \left(\frac{3}{15} \times 8\right) + \left(\frac{2}{15} \times 8\right)$

$= -\frac{4}{15} + 0 + \frac{12}{15} + \frac{32}{15} + \frac{24}{15} + \frac{16}{15}$

$= \frac{80}{15} = 5.33$

$E(I_3(x)) = \boxed{4.93}$

$E(I_4(x)) = \boxed{5.33}$

b) $x = 1, 2, 3, 4, 5$

$I_s(x) = 4x - 2 \times 5 = 4x - 10$

$x > 5$

$I_s(x) = 4 \times 5 - 2 \times 5 = 20 - 10 = 10$

$E(I_s(x)) = \sum_{x=1}^{6} P(x) \cdot I_s(x)$

$P(x = 1) = 1/15$ , $\quad I_s(1) = 4 \cdot 1 - 10 = -6$

$P(x = 2) = 2/15$ , $\quad I_s(2) = 4 \cdot 2 - 10 = -2$

$P(x = 3) = 3/15$ , $\quad I_s(3) = 4 \cdot 3 - 10 = 2$

$P(x = 4) = 4/15$ , $\quad I_s(4) = 4 \cdot 4 - 10 = 6$

$P(x = 5) = 3/15$ , $\quad I_s(5) = 4 \cdot 5 - 10 = 10$

$P(x = 6) = 2/15$ , $\quad I_s(6) = 10$

$E(I_s(x)) = -\dfrac{6}{15} - \dfrac{4}{15} + \dfrac{6}{15} + \dfrac{24}{15} + \dfrac{30}{15} + \dfrac{20}{15}$

$= 4.67$

$E(I_6(x)) = 3.20$