

**PRE029006 - PROCESSOS ESTOCÁSTICOS (2024 .2 - T01)**

Avaliação 2

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10. Sejam  $B_1, B_2, B_3, B_4 \sim \text{Unif}(\{0, 1\})$  variáveis aleatórias sorteadas independentemente.

Sejam

$$X = B_1 + B_2 + B_3 + B_4,$$

$$Y = B_1 B_2 B_3 B_4.$$

(a) Determine a PMF conjunta de  $X$  e  $Y$ .(b) Determine e esboce as PMFs marginais de  $X$  e  $Y$ .(c) Determine e esboce as PMFs condicionais de  $X$  dado que  $Y = y$ , para dois valores de  $y \in \mathcal{S}_Y$  à sua escolha.

a)

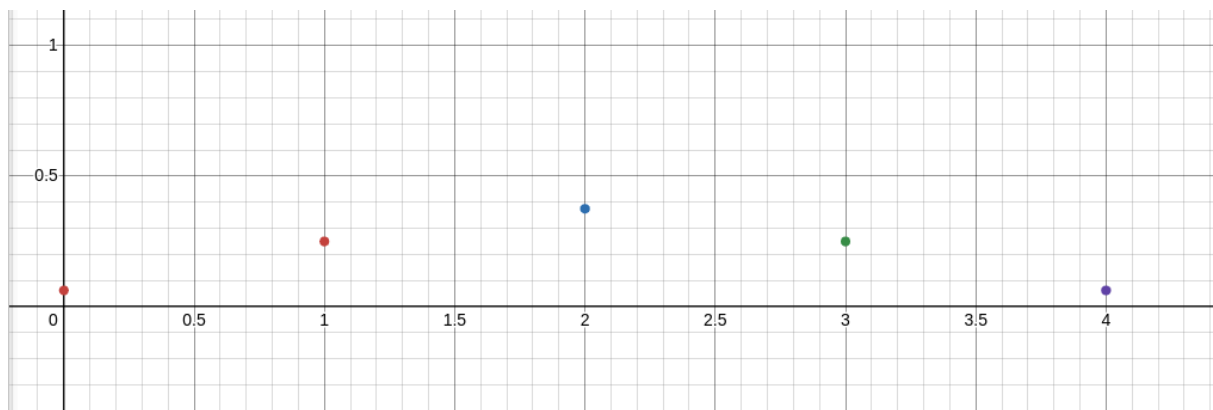
$B_1$	$B_2$	$B_3$	$B_4$	$X = B_1+B_2+B_3+B_4$	$Y = B_1B_2B_3B_4$	$P(X, Y)$
0	0	0	0	0	0	1/16
0	0	0	1	1	0	1/16
0	0	1	0	1	0	1/16
0	0	1	1	2	0	1/16
0	1	0	0	1	0	1/16
0	1	0	1	2	0	1/16
0	1	1	0	2	0	1/16
0	1	1	1	3	0	1/16
1	0	0	0	1	0	1/16
1	0	0	1	2	0	1/16
1	0	1	0	2	0	1/16
1	0	1	1	3	0	1/16
1	1	0	0	2	0	1/16
1	1	0	1	3	0	1/16
1	1	1	0	3	0	1/16
1	1	1	1	4	1	1/16
					Probabilidade Total:	1,00

$X/Y$	0	1
0	1/16	0
1	4/16	0
2	6/16	0
3	4/16	0
4	0	1/16

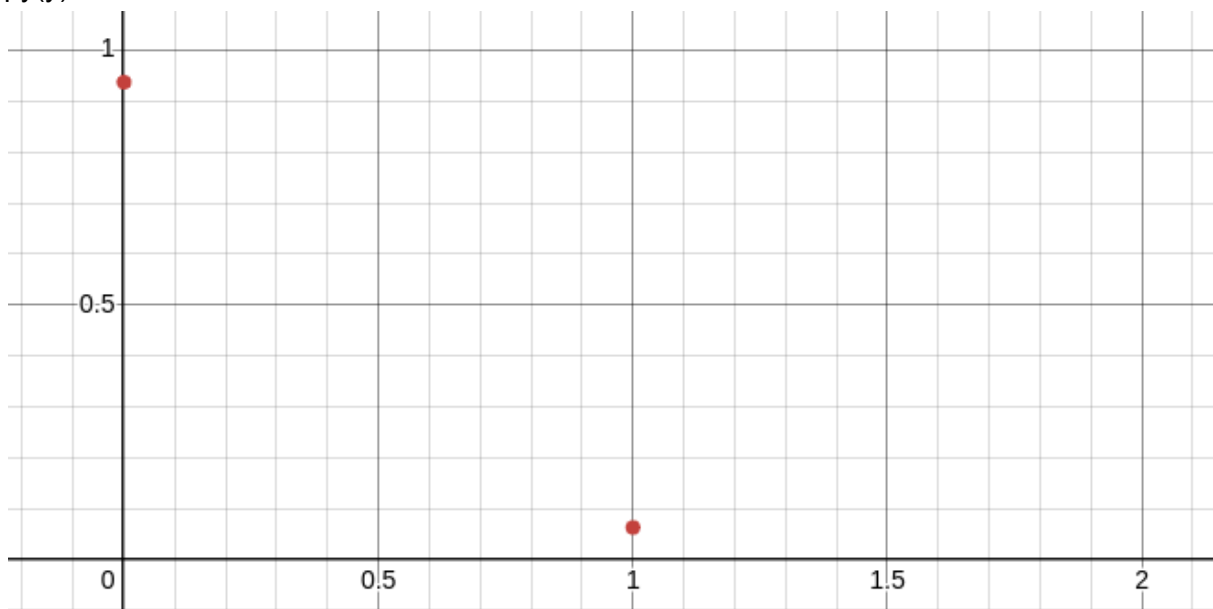
b)

X/Y	0	1	px(x)
0	1/16	0	1/16
1	4/16	0	4/16
2	6/16	0	6/16
3	4/16	0	4/16
4	0	1/16	1/16
py(y)	15/16	1/16	1

px(x)



py(y)

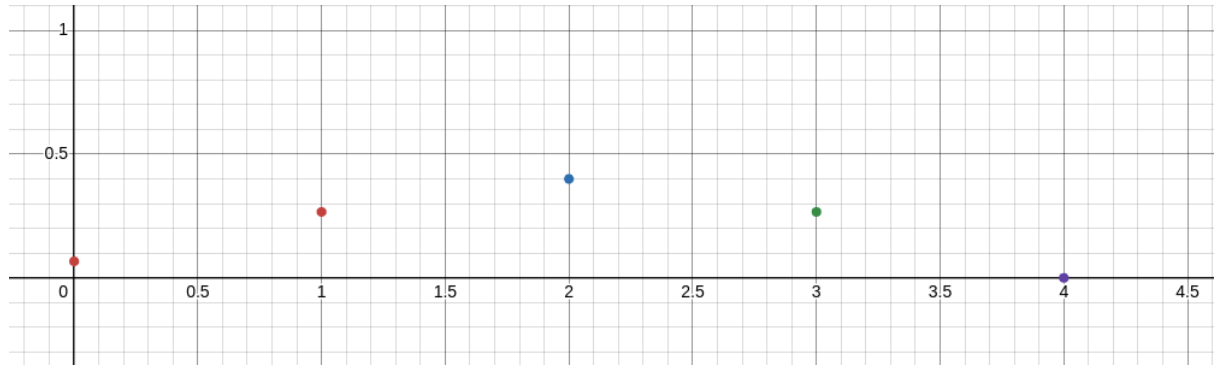


c)

$$p_{X|Y}(x | Y = y) = p_{X,Y}(x,y)/p_Y(y)$$

	X=0	X=1	X=2	X=3	X=4
$p_X(x   Y = 0)$	1/15	4/15	6/15	4/15	0
$p_X(x   Y = 1)$	0	0	0	0	1

$$p_X(x | Y = 0)$$



$$p_X(x | Y = 1)$$

