

Joint Probability Distributions

Joint Distribution

- Considering A_1, A_2, A_3, A_4 , and also B_1, B_2, B_3

	A_1	A_2	A_3	A_4
B_1	$P(A_1 \cap B_1)$	$P(A_2 \cap B_1)$	$P(A_3 \cap B_1)$	$P(A_4 \cap B_1)$
B_2	$P(A_1 \cap B_2)$	$P(A_2 \cap B_2)$	$P(A_3 \cap B_2)$	$P(A_4 \cap B_2)$
B_3	$P(A_1 \cap B_3)$	$P(A_2 \cap B_3)$	$P(A_3 \cap B_3)$	$P(A_4 \cap B_3)$

Marginal Distributions

- Considering A1, A2, A3, A4, and also B1, B2, B3

	A1	A2	A3	A4	Marginal
B1	$P(A1 \cap B1)$	$P(A2 \cap B1)$	$P(A3 \cap B1)$	$P(A4 \cap B1)$	$P(B1)$
B2	$P(A1 \cap B2)$	$P(A2 \cap B2)$	$P(A3 \cap B2)$	$P(A4 \cap B2)$	$P(B2)$
B3	$P(A1 \cap B3)$	$P(A2 \cap B3)$	$P(A3 \cap B3)$	$P(A4 \cap B3)$	$P(B3)$
Marginal	$P(A1)$	$P(A2)$	$P(A3)$	$P(A4)$	1

Conditional Distribution of Columns

- Considering A1, A2, A3, A4, and also B1, B2, B3

Conditional	A1	A2	A3	A4
B1	$P(B1 A1)$	$P(B1 A2)$	$P(B1 A3)$	$P(B1 A4)$
B2	$P(B2 A1)$	$P(B2 A2)$	$P(B2 A3)$	$P(B2 A4)$
B3	$P(B3 A1)$	$P(B3 A2)$	$P(B3 A3)$	$P(B3 A4)$
Marginal	$P(A1)$	$P(A2)$	$P(A3)$	$P(A4)$

Conditional Distribution of Rows

- Considering A1, A2, A3, A4, and also B1, B2, B3

	A1	A2	A3	A4	Marginal
B1	$P(A1 B1)$	$P(A2 B1)$	$P(A3 B1)$	$P(A4 B1)$	$P(B1)$
B2	$P(A1 B2)$	$P(A2 B2)$	$P(A3 B2)$	$P(A4 B2)$	$P(B2)$
B3	$P(A1 B3)$	$P(A2 B3)$	$P(A3 B3)$	$P(A4 B3)$	$P(B3)$