Statistics and Probability

Discrete Random Variables

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Discrete Random Variables

Consider the random variables X and Y. Both X and Y take the values 0, 1 and 2. The joint probabilities for each pair are given by the following table.

	$X = 0$	$X = 1$	$X = 2$
$Y = 0$	0.1	0.15	0.1
$Y = 1$	0.1	0.1	0.1
$Y = 2$	0.2	0.05	0.1

Compute the $E(U)$ expected value of U, where $U = X - Y$.

Discrete Random Variables

Compute $X - Y$

	$X = 0$	$X = 1$	$X = 2$
$Y = 0$	0.1	0.15	0.1
$Y = 1$	0.1	0.1	0.1
$Y = 2$	0.2	0.05	0.1

Discrete Random Variables

Compute $X - Y$

	U	$X = 0$	U	$X = 1$	U	$X = 2$
$Y = 0$	0	0.1	1	0.15	2	0.1
$Y = 1$	-1	0.1	0	0.1	1	0.1
$Y = 2$	-2	0.2	-1	0.05	0	0.1

Determine the probability of each outcome of U.

u_i	-2	-1	0	1	2
p (u_i)					

Discrete Random Variables

$$E(U) = \sum u_i \cdot p(u_i)$$

u_i	-2	-1	0	1	2
p (u_i)	0.20	0.15	0.30	0.25	0.10
$u_i \cdot p(u_i)$					

Discrete Random Variables

$$E(U) = \sum u_i \cdot p(u_i)$$

u_i	-2	-1	0	1	2
p (u_i)	0.20	0.15	0.30	0.25	0.10
$u_i \cdot p(u_i)$	-0.40	-0.15	0.00	0.25	0.20

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$$E(U) = -0.10$$

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