Chapter-13 Probability

Excercise-3

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Question 12.13.3.71: State True or False for the statement.
If $\Pr(A) > 0$ and $\Pr(B) > 0$. Then A and B can be mutually exclusive and independent.
Solution: Since $\Pr(A) > 0$ and $\Pr(B) > 0$, then,

$$\Pr(A)\Pr(B) > 0 \tag{1}$$

But, for $\Pr(A)$ and $\Pr(B)$ to be mutually exclusive and independent events

$$\Pr(AB) = 0 \tag{2}$$

$$\Pr(AB) = \Pr(A)\Pr(B) \tag{3}$$

$$\implies \Pr(A)\Pr(B) = 0 \tag{4}$$

Thus, (4) contradicts our initial assumption (1) Hence, The above statement is false