AI1103 - Assignment 4

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Download all latex-tikz codes from

https://github.com/262001/Assignment−4/blob/main/MAIN.tex

Problem

Suppose A,B,C are events in a common probability space with
$\Pr(A) = 0.2 \quad \Pr(B) = 0.2 \quad \Pr(C) = 0.3 \quad \Pr(A \cdot B) = 0.1 \quad \Pr(A \cdot C) = 0.1 \quad \Pr(B \cdot C) = 0.1$
Which of the following are possible values of $\Pr(A + B + C)$?

1) 0.5
2) 0.3
3) 0.4
4) 0.9

Solution

$$S = \Pr(A + B + C)$$
$$S = \Pr(A) + \Pr(B) + \Pr(C) - \Pr(A \cdot B) - \Pr(B \cdot C) - \Pr(A \cdot C) + \Pr(A \cdot B \cdot C)$$
$$S = 0.2 + 0.2 + 0.3 - 3 \cdot (0.1) + \Pr(A \cdot B \cdot C)$$
$$S = 0.4 + \Pr(A \cdot B \cdot C)$$
$$S \geq 0.4$$

Hence, (1), (3) and (4) are possible values of $\Pr(A + B + C)$