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
$\Pr(A) = 0.2$, $\Pr(B) = 0.2$, $\Pr(C) = 0.3$, $\Pr(AB) = 0.1$, $\Pr(AC) = 0.1$ and $\Pr(BC) = 0.1$
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

$$S = \Pr(A + B + C) \tag{0.0.1}$$

$$S = \Pr(A) + \Pr(B) + \Pr(C) - \Pr(AB) - \Pr(BC) - \Pr(AC) + \Pr(ABC) \tag{0.0.2}$$

$$S = 0.2 + 0.2 + 0.3 - 0.1 - 0.1 - 0.1 + \Pr(ABC)$$

$$S = 0.4 + \Pr(ABC) \tag{0.0.3}$$

$$S \geq 0.4 \tag{0.0.4}$$

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