AI5002: Assignment 6

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Download all Python codes from

https://github.com/Debolena/AI5002−Probability−and−Random−Variables/blob/main/Assignment_6/python_code.py

and latex-tikz codes from

https://github.com/Debolena/AI5002−Probability−and−Random−Variables/blob/main/Assignment_6/latex.tex

1 Problem

An electronic assembly consists of two subsystems, say, A and B. From previous testing procedures, the following probabilities are assumed to be known:
P(A fails) = 0.2
P(B fails alone) = 0.15
P(A and B fail) = 0.15
Evaluate the following probabilities:

1) P(A fails—B has failed)
2) P(A fails alone)

2 Solution

Given,

$$P(A \cap B) = 0.15 \tag{2.0.1}$$

$$P(B\ fails\ alone) = P(B) - P(A \cap B) = 0.15 \tag{2.0.2}$$

$$\implies P(B) = 0.15 + 0.15 = 0.30 \tag{2.0.3}$$

$$\tag{2.0.4}$$

1)

$$P(A\ fails \mid B\ has\ failed) = \frac{P(A \cap B)}{P(B)} \tag{2.0.5}$$

$$= \frac{0.15}{0.30} = 0.5 \tag{2.0.6}$$

2)

$$P(A\ fails\ alone) = P(A) - P(A \cap B) \tag{2.0.7}$$

$$= 0.2 - 0.15 = 0.05 \tag{2.0.8}$$