Assignment 1

AI1110:Probability And Random Variables

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12.13.6.19:If A and B are any two events such that $\Pr(A)$+$\Pr(B)$-$\Pr(AB)$=$\Pr(A)$,then choose the correct option

(a) $\Pr(B|A)$=1
(b) $\Pr(A|B)$=1
(c) $\Pr(B|A)$=0
(d) $\Pr(A|B)$=0

Solution: Given

$$\Pr(A) + \Pr(B) - \Pr(AB) = \Pr(A) \tag{1}$$
$$\Pr(B) - \Pr(AB) = 0 \tag{2}$$
$$\Pr(B) = \Pr(AB) \tag{3}$$

1) $\Pr(B|A)$

$$\Pr(B|A) = \frac{\Pr(AB)}{\Pr(A)} \tag{4}$$
$$\implies = \frac{\Pr(B)}{\Pr(A)} \tag{5}$$

2) $\Pr(A|B)$

$$\Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} \tag{6}$$
$$\implies = \frac{\Pr(B)}{\Pr(B)} \tag{7}$$
$$\implies = 1 \tag{8}$$

$\therefore$ **Option b is Correct**