Assignment: Probability

T.Sai Raghavendra - FWC22087

Problem: If A and B are events such that P(A|B) = P(B|A), then

(i) A $\subset$ B but A $\neq$ B

(ii) A = B

(iii) A $\cap$ B = ϕ

(iv) P(A) = P(B)

Solution: Given, P(A|B) = P(B|A)

$$\implies \frac{P(AB)}{P(B)} = \frac{P(BA)}{P(A)} \tag{1}$$

$$\implies \frac{P(AB)}{P(B)} = \frac{P(AB)}{P(A)} (Since P(AB) = P(BA)) \tag{2}$$

$$\implies \frac{1}{P(B)} = \frac{1}{P(A)} \tag{3}$$

$$\therefore P(A) = P(B) \tag{4}$$