Indian Institute of Technology Hyderabad

PROBABILITY ASSIGNMENT

MOHAMMAD IMRAN

January 11, 2023

1 problem

Let A and B be independent events with $\Pr(A) = 0.3$ and $\Pr(B) = 0.4$ Find

1. $\Pr(AB)$
2. $\Pr(A + B)$
3. $\Pr(A|B)$
4. $\Pr(B|A)$

2 solution

Since A and B are independent events, we have

1.

$$\Pr(AB) = \Pr(A)\Pr(B) \tag{1}$$
$$\Pr(AB) = 0.3 \times 0.4 \tag{2}$$
$$\Pr(AB) = 0.12 \tag{3}$$

2.

$$\Pr(A + B) = \Pr(A) + \Pr(B) - \Pr(AB) \tag{4}$$
$$\Pr(A + B) = 0.3 + 0.4 - 0.12 = 0.58 \tag{5}$$

3.

$$\Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} = \frac{0.12}{0.40} = 0.3 \tag{6}$$

4.

$$\Pr(B|A) = \frac{\Pr(BA)}{\Pr(A)} = \frac{0.12}{0.30} = 0.4 \tag{7}$$