Assignment 1 in LaTeX

Pranay Jain*

Assignment 1

Problem 12.13.1.4 : Evaluate $P(A \cup B)$ if $2P(A) = P(B) = \frac{5}{13}$ and $P(A|B) = \frac{2}{5}$.
Answer 12.13.1.4 :
Given, $2P(A) = P(B) = \frac{5}{13}$, $P(A|B) = \frac{2}{5}$
$\Rightarrow P(B) = \frac{5}{13}$, $P(A) = \frac{5}{26}$, $P(A|B) = \frac{2}{5}$
We know by conditional Probability:
$P(A|B) = \frac{P(A \cap B)}{P(B)}$
$P(A \cap B) = P(A|B) \times P(B)$
$P(A \cap B) = \frac{2}{5} \times \frac{5}{13} = \frac{2}{13}$
Now, We know
$P(A \cup B) = P(A) + P(B) - P(A \cap B) \Rightarrow P(A \cup B) = \frac{5}{26} + \frac{5}{13} - \frac{2}{13} = \frac{5+10-4}{26} = \frac{15-4}{26}$
$\Rightarrow P(A \cup B) = \frac{11}{26}$

*The student is with the Department of Artificial Intelligence, Indian Institute of Technology, Hyderabad 502285 India e-mail: ai22btech11020@iith.ac.in.