Question 11.16.3.64
Probability and Random Processes

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You are given that A and B are two events such that $\Pr(B) = \frac{3}{5}, \Pr(A|B) = \frac{1}{2}$ and $\Pr(A+B) = \frac{4}{5}$,then $\Pr(A)$ equals

Solution:

$$\Pr(A|B) = \frac{1}{2} \tag{1}$$

$$\frac{\Pr(AB)}{\Pr(B)} = \frac{1}{2} \tag{2}$$

$$\Pr(AB) = \frac{\Pr(B)}{2} \tag{3}$$

$$= \frac{3}{10} \tag{4}$$

$$\Pr(A+B) = \frac{4}{5} \tag{5}$$

$$\Pr(A) + \Pr(B) - \Pr(AB) = \frac{4}{5} \tag{6}$$

$$\Pr(A) = \frac{4}{5} - \Pr(B) + \Pr(AB) \tag{7}$$

Substitute $\Pr(AB)$ from (4)

$$\Pr(A) = \frac{4}{5} - \frac{3}{5} + \frac{3}{10} \tag{8}$$

$$= \frac{1}{2} \tag{9}$$