Exemplar - 11.16.3.21

EE22BTECH11039 - Pandrangi Aditya Sriram*

Question: Seven persons are to be seated in a row. What is the probability that two particular persons sit next to each other?

Solution: Let X be a random variable as defined in the following table. The number of ways to arrange

RV	Values	Description
X	0	Not sitting next to each other
	1	Sitting next to each other

7 people is 7! and the number of ways to arrange 7 people in which the two particular people are adjacent to each other is $6! \times 2$ considering both of them as one unit and considering the arrangements within the unit. Thus,

$$p_X(1) = \frac{6! \times 2}{7!} \tag{1}$$

$$= \frac{2}{7} \tag{2}$$

$$p_X(0) = 1 - p_X(1) \tag{3}$$

$$= \frac{5}{7} \tag{4}$$