

Assignment 1

Jaswanth Chowdary Madala

- 1) Mother, Father and Son line up at random for a family picture. Determine $\Pr(E | F)$ where E : Son on one end, F : Father in middle

Solution: Consider the random variables X_1, X_2, X_3 which denotes the position that Mother, Father, Son take as described in the table 1.

RV	Values	Description
X_1	{1, 2, 3}	Mother: 1 - left, 2 - middle, 3 - right
X_2	{1, 2, 3}	Father: 1 - left, 2 - middle, 3 - right
X_3	{1, 2, 3}	Son: 1 - left, 2 - middle, 3 - right

TABLE 1: Random variables X_1, X_2, X_3

We have the probabilities of events E, F as shown in 1

Event	Probability
$\Pr(E) = \Pr(X_3 \in \{1, 3\})$	$\frac{2}{3}$
$\Pr(F) = \Pr(X_2 = 2)$	$\frac{1}{3}$
$\Pr(EF)$	$\frac{1}{3}$

TABLE 1: Probabilities

By using property of conditional probability we have,

$$\Pr(E | F) = \frac{\Pr(EF)}{\Pr(F)} \quad (0.0.1)$$

From the table 1 we have

$$\Pr(E | F) = 1 \quad (0.0.2)$$