

PT Assignment 10

1. The joint density of X and Y is

$$\begin{cases} f_{X,Y}(x,y) = \frac{e^{-x/y}e^{-y}}{y} & x,y > 0 \\ 0 & \text{otherwise} \end{cases}$$

Compute $E(X \mid Y = y)$ for positive y .

2. On Main Street, a driver's speed just before an accident is uniformly distributed on $[5, 20]$. Given the speed, the resulting loss from the accident is exponentially distributed with mean equal to three times the speed. Calculate the variance of a loss due to an accident on Main Street. 7.
3. Toss a fair coin until you toss Heads for the first time. Each time you toss Tails, roll a die and collect as many dollars as the number on the die. Let S be your total winnings. Compute $E[S]$ and $\text{Var}[S]$.
4. Let $E[X \mid Y = y] = 3y$, $\text{Var}[X \mid Y = y] = 2$ and let Y have density function

$$f_Y(y) = \begin{cases} e^{-y} & \text{for } y > 0 \\ 0 & \text{otherwise} \end{cases}$$

Find $E[X]$ and $\text{Var}[X]$.