ECE 3100 - PSet 9

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1 Answers

1. Expected Value of Joint pmfs

   (a) Show Implications of Expected Value Rule.
   Let $g(X,Y) = X + Y$.

$$\begin{aligned}\mathbb{E}(X+Y) &= \int_{-\infty}^{\infty}\int_{-\infty}^{\infty}(X+Y)f_{X,Y}(x,y)dxdy \\ &= \\ &= \int_{-\infty}^{\infty}\int_{-\infty}^{\infty}xf_X(x,y)dxdy + \int_{-\infty}^{\infty}\int_{-\infty}^{\infty}yf_Y(y)dy \\ &= \mathbb{E}(X) + \mathbb{E}(Y)\end{aligned}$$

   (b) Sketch subset of W.

   (c) Show $f_Z = \int_{-\infty}^{\infty} f_{X,Y}(x, z-x)dx$

   (d) Compute $\mathbb{E}(Z)$.

2. Marginal pdfs not determining joint pdfs

   (a) X and Y jointly uniform

   (b) X and Y joint pdf

3. Sam breaks a stick

4. Maddy's Commute to Work

   (a) How many minutes before work

   (b) Interpret the parameter

   (c) Find mean and standard deviation

   (d) Calulate t^*

   (e) Describe dependencies of t^*

5. Binary Communication Channel

   (a) Conditional pdf $f_{Y|A}(y)$

   (b) Marginal pdf $f_Y(y)$.

   (c) $\mathbb{P}(\{X = c\} \mid \{Y > 0\})$