Assignment 11

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June 12, 2022

Outline

Question

Papoulis 9.1

In the fair experiments, we define the process x(t) as follows: $x(t) = \sin(\pi t)$ if heads show, $x(t) = 2t$ if tails show. (a) Find E[x(t)]. (b) Find F(x, t) for t = 0.25, t = 0.50, and t = 1.

Solution

For Head,

$$x(t) = \sin(\pi t) \tag{1}$$
$$E[x(t)] = E[\sin(\pi t)] \tag{2}$$
$$= \frac{\sin(\pi t)}{2} \tag{3}$$

For Tail,

$$x(t) = 2t \tag{4}$$
$$E[x(t)] = E[2t] \tag{5}$$
$$= \frac{2t}{2} \tag{6}$$
$$= t \tag{7}$$

$$E[x(t)] = \frac{\sin(\pi t)}{2} + t \tag{8}$$

$$E[\underline{x}(t)] = t + 0.5\sin(\pi t) \tag{9}$$

$$\underline{x}(t, H) = \sin(\pi t) = \begin{cases} \frac{1}{\sqrt{2}} & t = 0.25 \\ 1 & t = 0.5 \\ 0 & t = 1 \end{cases} \tag{10}$$

$$\underline{x}(t, T) = 2t = \begin{cases} 0.5 & t = 0.25 \\ 1 & t = 0.5 \\ 2 & t = 1 \end{cases} \tag{11}$$