ECE 302 Quiz 6
(10 points)

Name: Solution (3 points) 07/28/2016

1. Let $X(t)$ be a random process defined by

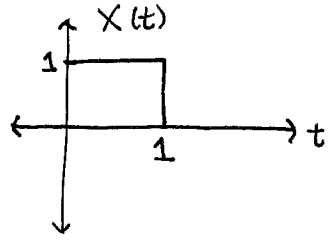
$$X(t) = \begin{cases} A & , 0 \le t \le 1, \\ 0 & , \text{else}, \end{cases}$$

where A is a discrete random variable that takes on the values 1 and -1 with probability 1/2. **Show all work.**

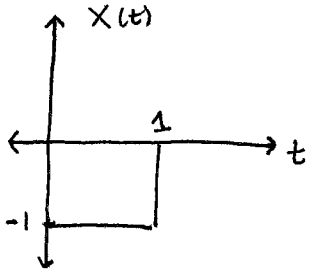
(a) (4 points) Plot all the possible sample functions of $X(t)$. Specify what the outcome is in each case.

(b) (3 points) Find the pmf of $X(t)$ for any fixed $t \in (-\infty, \infty)$.

(a)



A = 1



A = -1

(b) For a fixed t, $X(t)$ is a discrete r.v. that takes on values $0, 1, -1$. Want $P_{X(t)}(x_i)$ for $x_i \in \{0, 1, -1\}$

$$P_{X(t)}(0) = \begin{cases} 0 & , t \in [0,1] \\ 1 & , t \notin [0,1] \end{cases}, \quad P_{X(t)}(1) = P_{X(t)}(-1) = \begin{cases} 1/2 & , t \in [0,1] \\ 0 & , t \notin [0,1] \end{cases}$$