

## 第二章：作业

$$3. X(t) = At + (1-A)B, t \geq 0$$

$$P(A=0) = P(A=1) = P(A=-1) = \frac{1}{3}, P(B=0) = P(B=1) = P(B=-1) = \frac{1}{3}$$

$$(1) X_1(t) = 0, A=0, B=0$$

$$X_2(t) = 1, A=0, B=1$$

$$X_3(t) = -1, A=0, B=-1$$

$$X_4(t) = t, A=1$$

$$X_5(t) = -t, A=-1$$

$$(2) P(X(t)=1) = P(A=0, B=1) + P(A=1) = \frac{1}{3} \times \frac{1}{3} + \frac{1}{3} = \frac{4}{9}$$

$$P(X(2)=1) = P(A=0, B=1) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

$$P(X(t)=1, X(2)=1) = P(A=0, B=1) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

$$4. Z(t) = AX(t) + 1-A, t \geq 0$$

$$P(A=0) = P(A=1) = \frac{1}{2}, X \sim N(1,1)$$

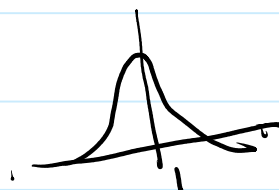
$$(1) Z_1(t) = 1, Z_2(t) = X(t)$$

$$P(Z(t) < 1) = P(Z_2(t) | A=1) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$\begin{aligned} P(Z(t) < 2) &= P(Z_2(t) | A=1) + P(Z_1(t) | A=0) \\ &= \frac{1}{2} \times P(Z_2 < 2) + \frac{1}{2} \\ &= \frac{1}{2} \times \frac{1}{2} + \frac{1}{2} = \frac{3}{4} \end{aligned}$$

$$\begin{aligned} P(Z(t) < 1, Z(2) < 2) &= P(Z_1(t) < 1 | Z(2) < 2) \cdot P(Z(t) < 1) \\ &= 1 \times \frac{1}{4} = \frac{1}{4} \end{aligned}$$

$$(2) \mu_{Z(t)} = E(Z(t)) = 1 \times \frac{1}{2} + t \times \frac{1}{2} = \frac{t+1}{2}$$



$$12) \mu_Z(t) = E(Z(t)) = 1 \times \frac{1}{2} + t \times \frac{1}{2} = \frac{1+t}{2}$$

$$R_Z(s, t) = C_Z(s, t) + \mu_Z(t) - \mu_Z(s) = \frac{1}{2} + st$$

$$7. \textcircled{1} \{W_k > n\} \Leftrightarrow \{V_n < k\} \quad (B)$$

$$\textcircled{2} \{W_k \geq n\} \Leftrightarrow \{V_{n-1} = k\} \quad (F)$$

$$\textcircled{3} \{W_k < n\} \Leftrightarrow \{V_{n-1} \geq k\} \quad (H)$$

$$\textcircled{4} \{W_k \leq n\} \Leftrightarrow \{V_n \geq k\} \quad (D)$$