Problem 1. Problem 4 of HW6.

Problem 2. Problem 4 of Chapter 3, page 57.

Problem 3. Problem 5 of Chapter 3, page 57.

Problem 4. Problem 1 of Chapter 4 parts (a) and (b).

Problem 5. Let \((V_n, n \geq 0)\) be i.i.d. \(N(0, \sigma^2)\) and independent of \(X_0 = N(0, u^2)\). Define
\[
X_{n+1} = aX_n + V_n, \quad n \geq 0.
\]
(a) What is the distribution of \(X_n\) for \(n \geq 1\)?
(b) Find \(E(X_{n+m}|X_n)\) for \(0 \leq n < n + m\).
(c) Find \(u\) so that the distribution of \(X_n\) is the same for all \(n \geq 0\).

Problem 6. Let \(\theta\) be uniform random variable in \([0, 1]\), and given \(\theta\), random variable \(X\) is uniformly distributed in \([0, \theta]\). Find \(E[\theta|X]\).