Math 4058-1 Homework

Homework 1: Due February 1 (Monday)

- Chapter 3: 3, 7, 9, 10, 12, 15, 30

  * Let X and Y be independent normal random variables with distributions $N(\mu_1, \sigma_1^2)$ and $N(\mu_2, \sigma_2^2)$, respectively. Find the conditional density function $f_{X|X+Y}(x|t)$.

Homework 2: Due February 19 (Friday)

- Chapter 3: 35, 36, 37, 44, 46, 77, 80

  * Let $\Omega = \cup_k B_k$ be a disjoint union. Prove that for any events A and C, we have

$$P(A|C) = \sum_k P(A|B_k, C)P(B_k|C).$$

  * Suppose $X_0, X_1, X_2, \ldots, X_n, \ldots$ is a sequence of random variables taking values in a set $S = \{s_i\}$ with at most countably many elements. Assume that for any $n \geq 0, i, j, i_0, i_1, \ldots, i_{n-1}$, the following equality holds:

$$P\{X_{n+1} = s_j \,|\, X_0 = s_{i_0}, X_1 = s_{i_1}, \ldots, X_{n-1} = s_{i_{n-1}}, X_n = s_i\}$$
$$= P\{X_{n+1} = s_j \,|\, X_n = s_i\}.$$

  Prove the following statements:

  (1) For any $n \geq 0, i, j, k$, the equality holds:

$$P\{X_{n+2} = s_j \,|\, X_n = s_i, X_{n+1} = s_k\} = P\{X_{n+2} = s_j \,|\, X_{n+1} = s_k\}.$$

  (2) For for any $m > n \geq 0, i, j, i_0, i_1, \ldots, i_{n-1}$, the equality holds:

$$P\{X_m = s_j \,|\, X_0 = s_{i_0}, X_1 = s_{i_1}, \ldots, X_{n-1} = s_{i_{n-1}}, X_n = s_i\}$$
$$= P\{X_m = s_j \,|\, X_n = s_i\}.$$

Homework 3: Due March 3 (Wednesday)

- Chapter 4: 5, 6, 7, 8, 13, 14, 15, 18

Exam (1) March 8, 2010 (Monday) 3.1–3.5, 4.1–4.5

Homework 4: Due March 22 (Monday)

- Chapter 5: 1, 2, 3, 8, 9

Homework 5: Due March 31 (Wednesday)

- Chapter 5: 11, 14, 15

Homework 6: Due April 16 (Friday)

- Chapter 5: 29, 31, 42

Homework 7: Due April 21 (Wednesday)

- Chapter 5: 5, 30, 44, 69

Exam (2) Apr 26, 2006 (Monday) 5.1–5.4

Homework 8: Practice problems

- Chapter 10: 2, 9, 25, 26

FINAL EXAM: May 14, 2010 (Friday), 7:30–9:30, Lockett 130