Homework #6
ST 554

Mixture Distribution

Let $f_1(x), \ldots, f_k(x)$ be valid PDFs and $p_1, \ldots, p_k$ satisfy $p_j \geq 0$ and $\sum_{j=1}^{k} p_j = 1$. Then the PDF of the rv X, given by

$$f_X(x) = \sum_{j=1}^{k} p_j f_j(x)$$

is called a mixture distribution.

    a. Show that $f_X(x)$ is a valid PDF.
    b. Find the moment generating function of X. Put the solution in terms of $M_j(t)$, the moment generating functions corresponding to $f_j(x)$ (for $j = 1, \ldots, k$).

Blitzstein & Hwang: Chapter 5

38, 39, 44, 47

Blitzstein & Hwang: Chapter 6

1, 3, 6, 7, 15, 17, 23

Extra problems: Chapter 5 (optional)

- solved: 41, 51, 55, 56, 57
- interest: 40, 46, 48, 51, 55, 56, 57

Extra problems: Chapter 6 (optional)

- solved: 13, 14, 21
- interest: 2, 11, 12, 25