

**Homework 7**

**Problems 1-2:** numbers 4.16 (a) and (c), and 4.17 from the textbook.

**Problem 3:** Let the random variable  $X$  represent the number of successes in  $n$  independent Bernoulli trials with success probability  $p$ . Let  $Y$  be the number of successes in the first  $m$  trials, where  $m < n$ . Find the conditional pmf of  $Y$  given  $X = x$  and the conditional mean.  
*Hint:* consider  $Y$  and  $X - Y$ .

**Problem 4:** Consider r.v.'s  $X$  and  $Y$  with joint pdf

$$f_{X,Y}(x, y) = \frac{1}{8} 1_{(0,y)}(x) 1_{(0,4)}(y).$$

Find  $P(X \geq 1 | Y \leq 2)$ .

**Problem 5:** Find the pdf of the ratio  $U = X/Y$  for the random vector  $(X, Y)$  with joint pdf

$$f_{X,Y}(x, y) = e^{-(x+y)} 1_{(0,\infty) \times (0,\infty)}(x, y).$$