STA2001 Tutorial 9

1. 4.3-10. Let $f_X(x) = 1/10, x = 0, 1, 2, \cdots, 9$, and $h(y|x) = 1/(10 - x), y = x, x + 1, \cdots, 9$. Find
   (a) $f(x, y)$.
   (b) $f_Y(y)$.
   (c) $E(Y|x)$.

od ?

2. 4.4-11. Let X and Y have the joint pdf $f(x,y) = cx(1-y)$, $0 < y < 1$, and $0 < x < 1-y$.

   (a) Determine the value of c.

   (b) Compute $P(Y < X | X \le 1/4)$.

$c \int_0^1 \int_0^{1-y} x(1-y)\, dx\, dy$

$= c \int_0^1 \frac{1}{2} x^2 (1-y) \Big|_0^{1-y} dy$

$\frac{1}{2} c \int_0^1 (1-y)^3 dy$

$u = 1-y$

$du = -dy$

$-\frac{1}{2} c \int_0^1 u^3 du$

$-\frac{1}{8} c \cdot u^4$

$x - xy$

$\frac{1}{2}x^2 - \frac{1}{2}yx^2$

$\sum h(y|x)$

$0<y<1$

$\int_0^{\frac{1}{4}} \int_0^x 8x(1-y)\, dy\, dx$

$\int_0^{\frac{1}{4}} \int_0^{1-x} 8x(1-y)\, dy\, dx$

感觉有点难度啊...

真的要完蛋了...

3. 4.4-20. Let X have a uniform distribution on the interval $(0, 1)$. Given that $X = x$, let Y have a uniform distribution on the interval $(0, x + 1)$.

   (a) Find the joint pdf of X and Y. Sketch the region where $f(x, y) > 0$.

   (b) Find $E(Y|x)$, the conditional mean of Y, given that $X = x$. Draw this line on the region sketched in part (a).

   (c) Find $f_Y(y)$, the marginal pdf of Y. Be sure to include the domain.