(T) $E_{\theta|x}\left((T-\tau(\theta))^2\right)$ T $\tau(\theta)$

$= E_{\theta|x}\left(T^2 - 2\tau(\theta)T + \tau(\theta)^2\right)$

$= T^2 - 2T E_{\theta|x}(\tau(\theta)) + E_{\theta|x}(\tau(\theta)^2)$

$= \left(T - E_{\theta|x}(\tau(\theta))\right)^2$

$T^* = E_{\theta|x}(\tau(\theta))$

$X \sim Bin(3, 0.5)$

0, 1, 2, 3

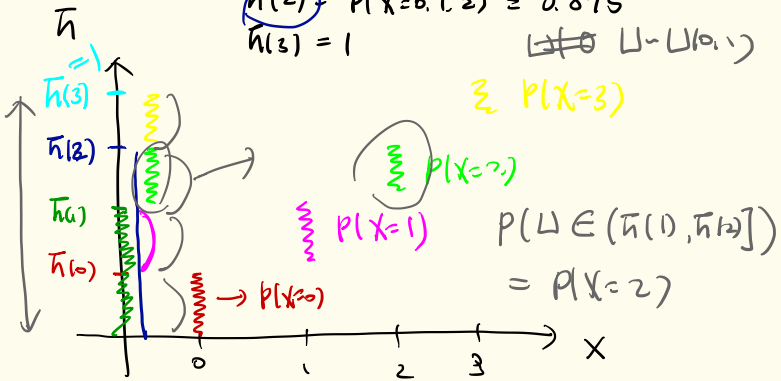
$\bar{n}(0) = P(X=0) = 0.125$

$\bar{n}(1) = P(X=0, X=1) = 0.5$

$\bar{n}(2) = P(X=0,1,2) = 0.875$

$\bar{n}(3) = 1$

$U \sim U(0,1)$



$P(U \in (\bar{n}(1), \bar{n}(2)]) = P(X=2)$

$$X \begin{cases} 0 & \text{wp } 0.5 \\ 1 & \text{wp } 0.3 \\ 2 & \text{wp } 0.2 \end{cases}$$

$X \Rightarrow \text{cdf } F \Rightarrow F_X^{-1} = -\frac{1}{\lambda}\log(1-y)$

$U \sim U(0,1)$

$Y = F_X^{-1}(U)$ $\qquad Y \stackrel{d}{=} X$