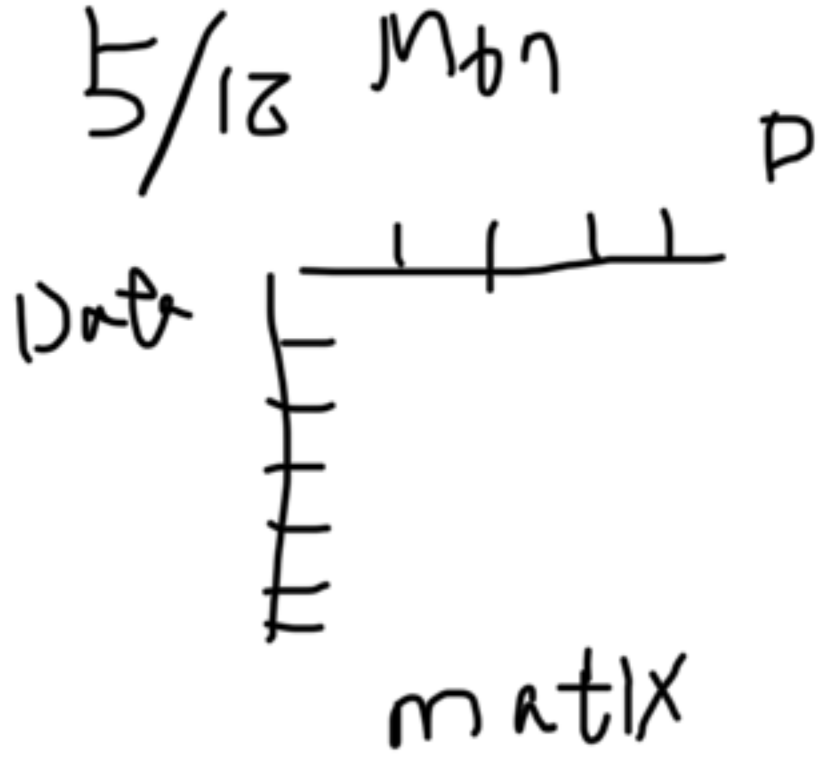
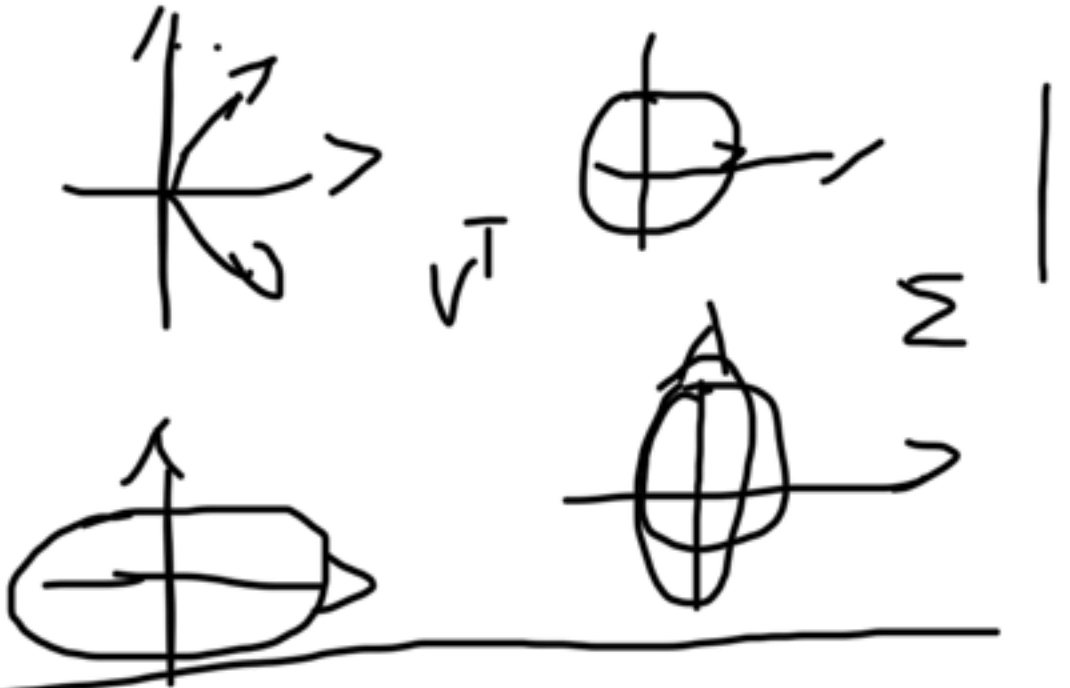
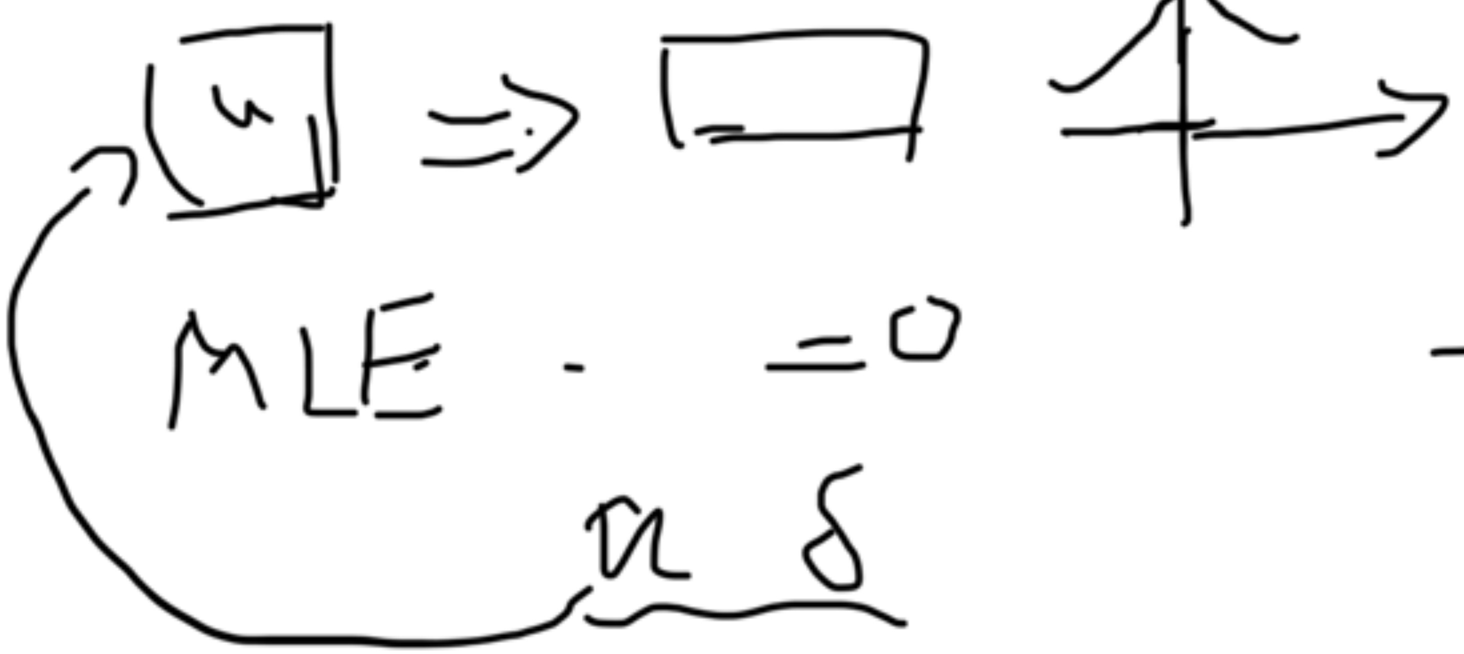
5/18 Mon



SVD $A = U \Sigma V^T$ (③ ② ①)



MLE



$N(u, \delta)$

$f(x|u, \delta) =$ ______

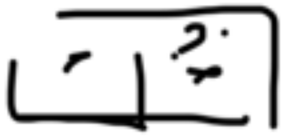
MLE $= 0$

$u \quad \delta$

$p = C_4^1 \left(\frac{1}{2}\right)^4 = \frac{4}{16}$

4×3

$P = C_4^2 (\frac{1}{2})^4 = \frac{6}{16}$



$P = C_4^3 (\frac{1}{2})^4 = \frac{4}{16}$

$P = \frac{1}{16}$

$Sum = \frac{1}{16} + \frac{4}{16} + \frac{6}{16} + \frac{4}{16} + \frac{1}{16} = 1$

$H = \log k \qquad P_i = \frac{1}{k} \qquad H = \sum \frac{1}{k} \log \frac{1}{1/k}$

$= \sum \frac{1}{k} \log k$

$= \log k$

$I(X, Y) = \sum p(x) \log \frac{1}{p(x)} - \sum_{x,y} p(x,y) \log \frac{1}{p(x|y)}$

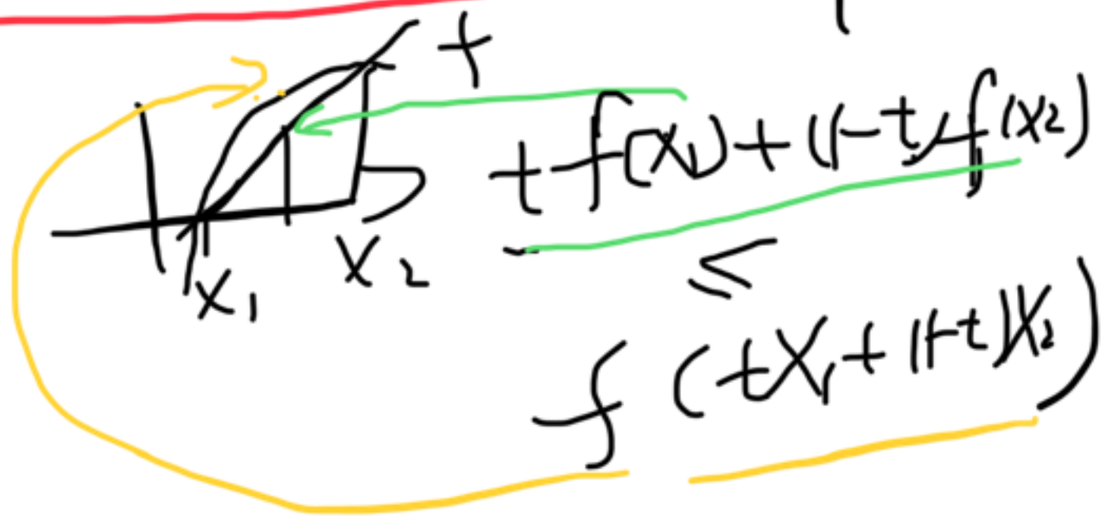
$p(x|y) \to \frac{p(y)}{p(x,y)}$

$= \sum_{x,y} p(x,y) \log \frac{1}{p(x)}$

$= \sum_{x,y} p(x,y) \frac{p(x,y)}{p(x)p(y)}$

$$H(X,Y) = H(X|Y) + H(Y)$$
$$= H(X) + H(Y|X)$$

Jensen



- KL = Cross - Entropy

$$= \sum p(s) \log \frac{1}{q(s)} - \sum p(s) \log \left(\frac{1}{p(s)}\right)$$

$$= \sum p(s) \log \frac{p(s)}{q(s)}$$

$f(\cdot) = \log_2$

$$\leq \sum \log p(s) \frac{p(s)}{q(s)} \Rightarrow \frac{q(s)}{p(s)}$$

$$\log \sum q(s) = 1 \quad -\log 1 = 0$$

$$\Rightarrow \quad KL \geq 0$$