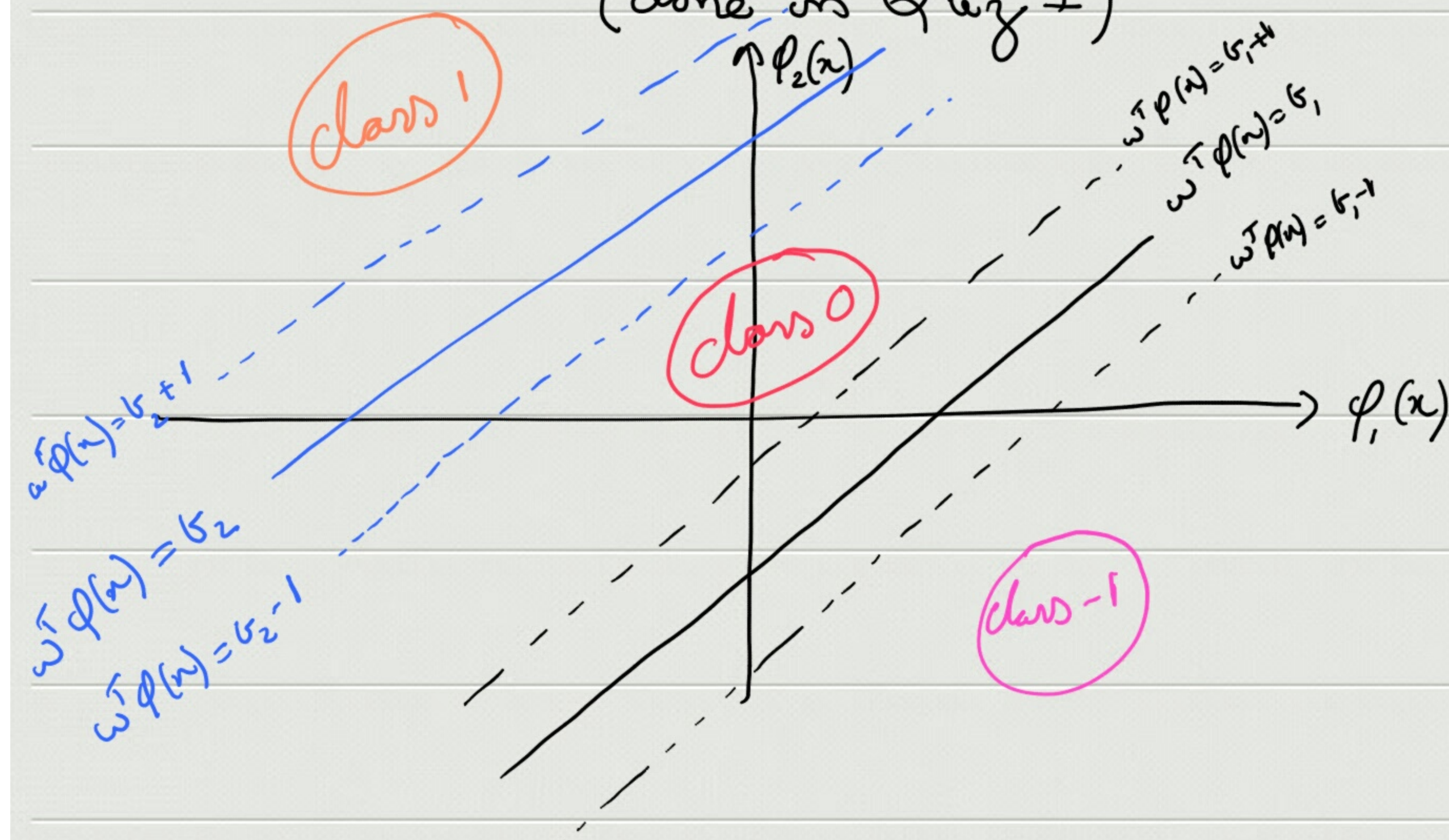


Ordinal Regression or Ordinal Classification

(done in Quiz I)



→ limiting case with threshold everywhere is Regression

$$Y = \mathbb{R} ; g(x) = \omega^T \phi(x)$$

→ Square-loss: $l(y - g(x)) = (y - g(x))^2$

$$\min_{\omega \in \mathbb{R}^n} \frac{1}{m} \sum_{i=1}^m (y_i - \omega^T \phi(x_i))^2$$

(Least squares problem)

$$\min_{\omega \in \mathbb{R}^n} \frac{1}{2} \|\omega\|^2 + \frac{C}{m} \sum_{i=1}^m (y_i - \omega^T \phi(x_i))^2$$

(regularized least squares / Ridge regression)

→ Optimality conditions give:

$$\omega^* = \left(\frac{mI}{2C} + XX^T \right)^{-1} XY$$

→ as $C \rightarrow \infty$, pseudo inverse of X .

→ Both these do not lead to Support Vector methods



$$l(y - w^T \phi(x)) = |y - w^T \phi(x)|$$

$$l(y - w^T \phi(x)) = \max(0, |y - w^T \phi(x)| - \epsilon)$$

