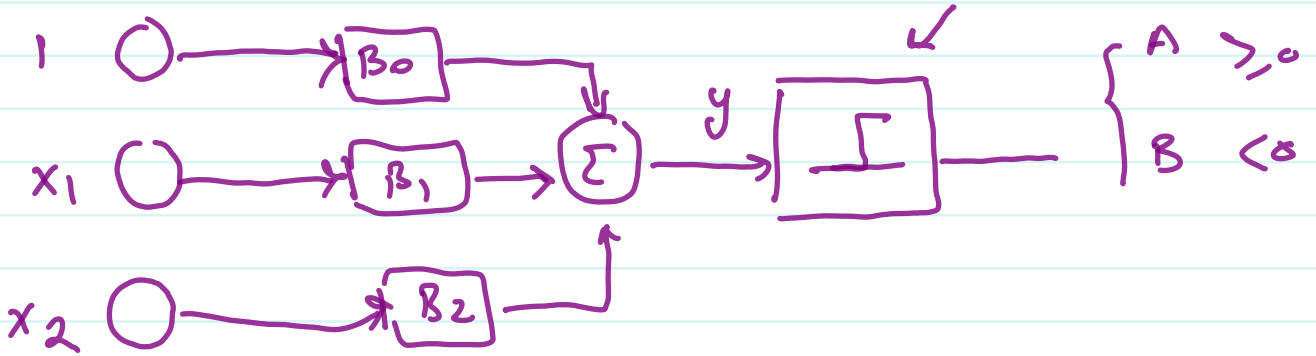
$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2$$

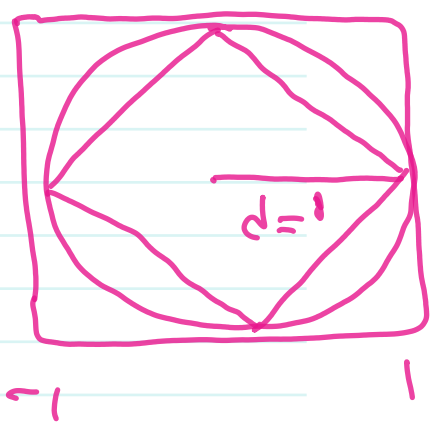


$$y = hardlim(x) = \begin{cases} 1 : & x \geq 0 \\ 0 : & Else \end{cases}$$

$$d = \sqrt[r]{(x - x_0)^r + (y - y_0)^r}$$

$x_0 \rightarrow 0$, $y_0 \rightarrow 0$

$$1 = \sqrt[r]{x^r + y^r}$$



$x \in [-1, 1]$

$\hookrightarrow 1 = x^r + y^r \rightarrow \boxed{y = \sqrt[r]{1 - x^r}}$

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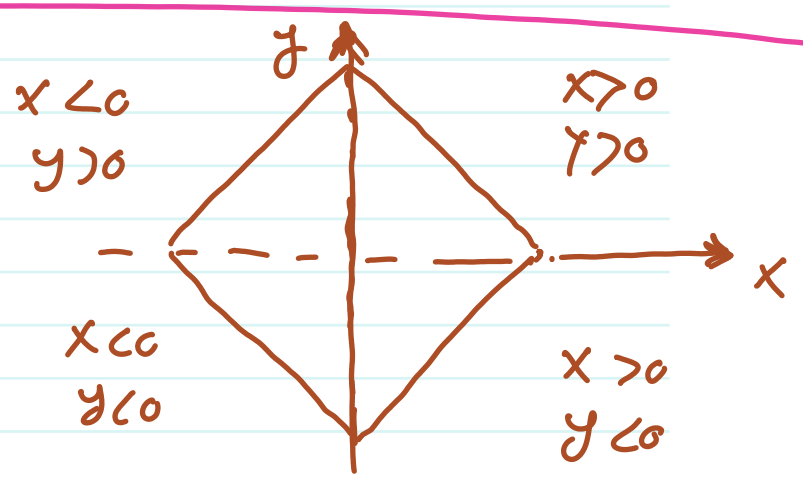
(4)



$$\begin{cases} x>0 \\ y>0 \end{cases} : \quad x+y=1$$

$$\begin{cases} x<0 \\ y>0 \end{cases} : \quad -x+y=1$$

$$y>0 : \quad |x|+y=1$$

(6) part (d)

$X \in \mathbb{R}^{n \times d} \rightarrow C \in \mathbb{R}^{d \times d} \rightarrow C^T = C$

Find e-vectors of C $\quad v_1, v_2, \ldots v_d$

$V = [v_1, v_2, \ldots v_d]$

$\Lambda = V^{-1} \cdot C \, V$

$C = \frac{\tilde{X}^T \tilde{X}}{N-1}$

diagonal $\begin{bmatrix} \lambda_1 & & 0 \\ & \lambda_2 & \\ & & \ddots \\ 0 & & \lambda_d \end{bmatrix}$

$\tilde{X} = U \Sigma V^T$ ←

$U^T U = I$

$V^T U = I$

$$RSS = e_1^2 + e_2^2 + \dots + e_n^2$$

$$\underline{e} = \begin{bmatrix} e_1 \\ e_2 \\ \vdots \\ e_n \end{bmatrix} \longrightarrow RSS = \underline{e}^T \cdot \underline{e}$$