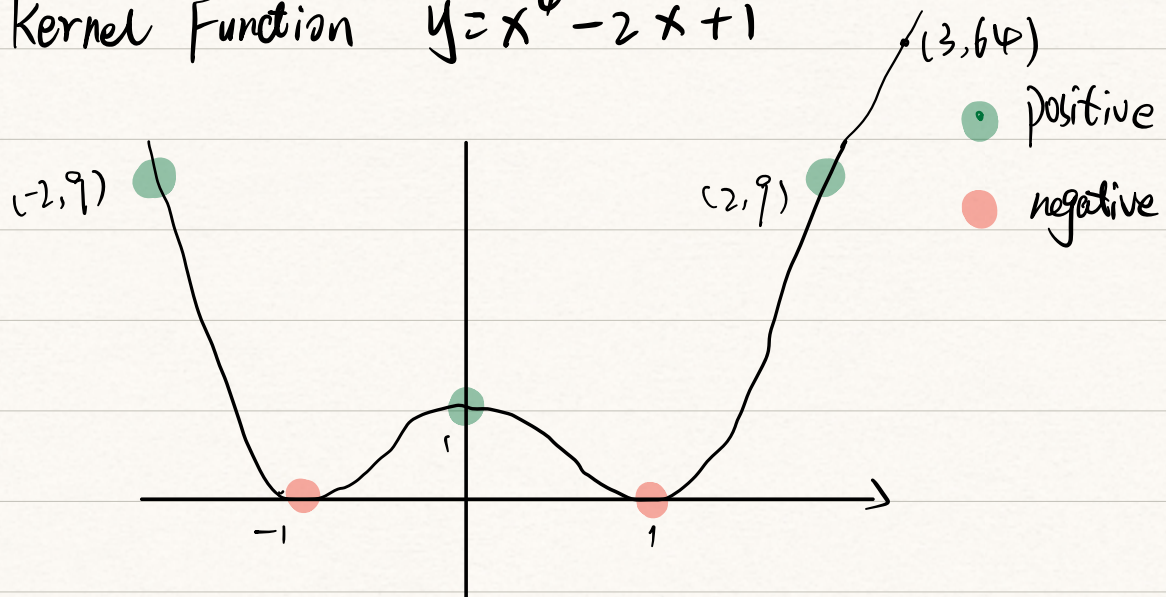


Kernel Function $y = x^4 - 2x^2 + 1$



1. I choose $(0, 1)$ as support vector for positive
 $(-1, 0)$ $(1, 0)$ for negative

Because these points are more ambiguous, others are further from decision boundary.

$$2. \begin{cases} w_2 + b = 1 \\ -w_1 + b = -1 \\ w_1 + b = -1 \end{cases} \rightarrow \begin{cases} w_1 = 0 \\ w_2 = 2 \\ b = -1 \end{cases} \rightarrow w(0, 2) \quad b = -1$$

3. hard margin for SVM =

$$\frac{2}{\|w\|} = \frac{2}{2} = 1$$

4. $A = (0, 5, 0.5625)$

we have $0 + 2 \times 0.5625 - 1 = 0.125 > 0$

$\Rightarrow (0.5, 0.5625)$ is positive point.

$$B = (1.5, 1.5625)$$

We have $0 + 2 \times 1.5625 - 1 = 2.125 > 0$

$\Rightarrow (1.5, 1.5625)$ is positive point.