SVM Kernels

① Polynomial Kernel

② RBF Kernel

③ Sigmoid Kernel

$\Rightarrow$ TRANSFORMATION

$\downarrow$

Mathematical Formula

① Polynomial Kernel

② RBF Kernel

③ Sigmoid Kernel

2d

3d

linear
SVC
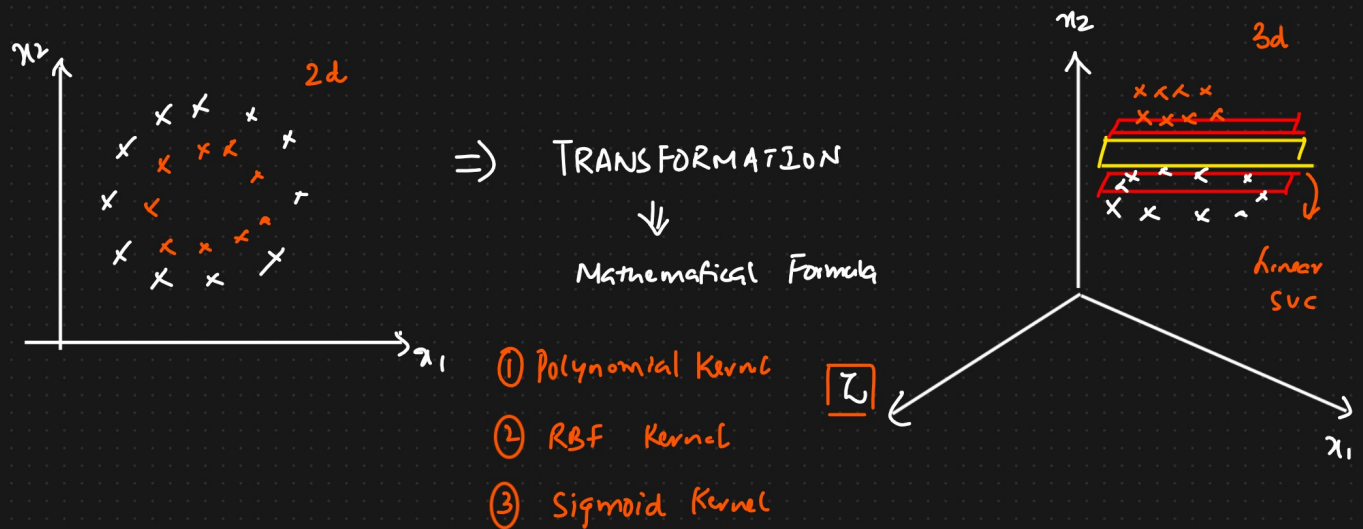
$x = [x_1, x_2]$

$y = [x_1, x_2]$

① Polynomial Kernel

$$f(x,y) = \left(x^T y + c \right)^d \qquad \boxed{c = 1}$$

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \cdot [x_1, x_2]$$

2d

$x_1 \quad x_2 \quad y \quad = \begin{bmatrix} x_1^2 & x_1 x_2 \\ x_1 x_2 & x_2^2 \end{bmatrix}$

$\Downarrow$ Transformation

$\Rightarrow$ Polynomial Kernel

3d

$x_1^2 \quad x_1 x_2 \quad x_2^2 \qquad y$

$-\quad\quad -\quad\quad -$

$-\quad\quad -$

x_1, x_2

3d

linear
SVC

x_2^2

x_1^2
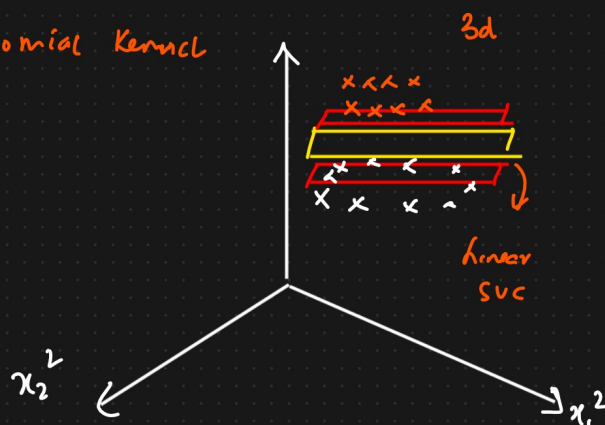
② RBF Kernel
⇓
Formula

③ Sigmoid Kernel
⇓
Formula