**Lecture 6 – Whiteboard notes**

## Linear Algebra basics – Inner product

u and v are two points in the input space**.** u+ v and u-v are represented in the figure below.

u + v

ƛv

w

c

v

u

u - v

w = u – v (Orange arrows)

c = ½ (u + v)

If d = 2, then and

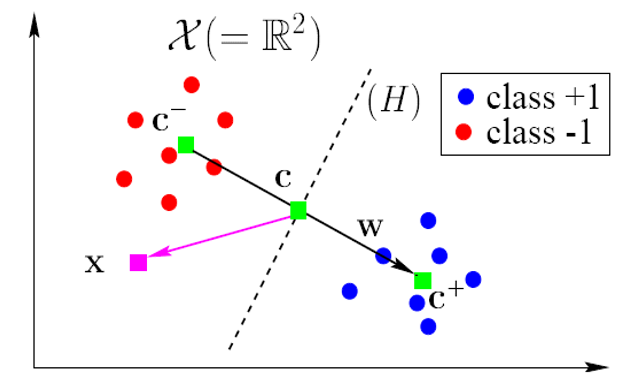
v (0,1)

u (1,0)

v (0,1)

u (1, -1)

## Classifying a new point X



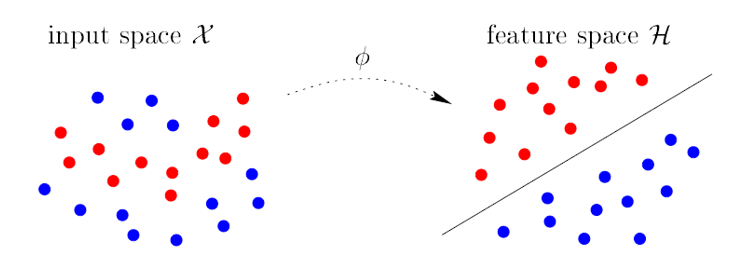
A new point x to be classified,

Substituting the value for w

Substituting the value for

## Kernel Trick

* Transforming the data which is not linearly separable to a linearly separable space using a transformation



Each point x in the new transformed space is given by (x)

A given pair of (x, y) is transformed into ( (x), y)

X = Input space

Φ(X) = Feature space

## Polynomial Kernel of degree 2

The input points have been transformed using kernel function