**Revision Questions:**

1. Define Point/Vector (2-D, 3-D, n-D)?

Vector = direction + magnitude, Vector is the change in the states Point is just a vector from the origin of coordinates. A point is the static point

1. How to calculate Dot product and angle between 2 vectors?

Let us consider A and B as two vectors, then Dot Product is

A.B = |A| |B| cos (Ɵ)

|A| = Length of A |B| = length of B

1. Define Projection, unit vector?

Let us consider A and B as two vectors. The projection of A over B is represent as

d =

d is the distance of the vector

Unit Vector =

Have the same direction as A but the length is always 1.

1. Equation of a line (2-D), plane(3-D) and hyperplane (n-D)?

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2D | 3D | Hyperplane |
| Line not with 0 origin | w0 + w1x1+w2x2 = 0 | w0+w1x1+w2x2+w3x3 = 0 | w0+w1x1+…..+wnxn = 0 |
| Line with 0 origin | w1x1+w2x2 = 0 | w1x1+w2x2+w3x3 = 0 | w0+w1x1+…..+wnxn = 0 |

1. Distance of a point from a plane/hyperplane, half-spaces?

d =

there will be 2 spaces in ever place/hyperplane. The points which lies on one space is positive because the angle between the 2 vectors w and P is less than 90 degree.

The points which lies on the other space is Negative because the angle between the 2 vectors w and P is greater than 90 degree.

1. Equation of a circle (2-D), sphere (3-D) and hypersphere (n-D)?

2D: Circle

3D:Sphere

nD:Hypersphere

1. Equation of an ellipse (2-D), ellipsoid (3-D) and hyperellipsoid (n-D)?

Ellipse :

Ellipsoid: (Egg shape or Rugby Shape)

Hyperellipsoid:

1. Square, Rectangle, Hyper-cube and Hyper-cuboid?