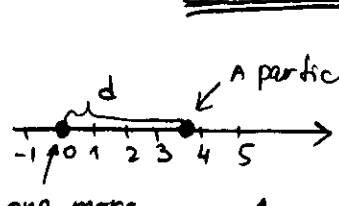
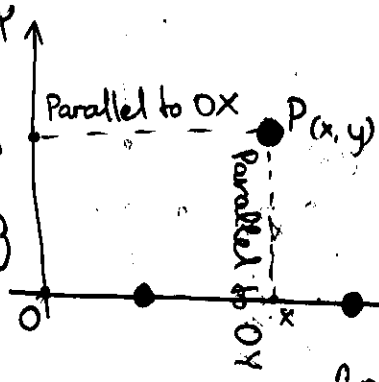
Cartesian Coordinates in 3-D

Q: What is the 3-D?



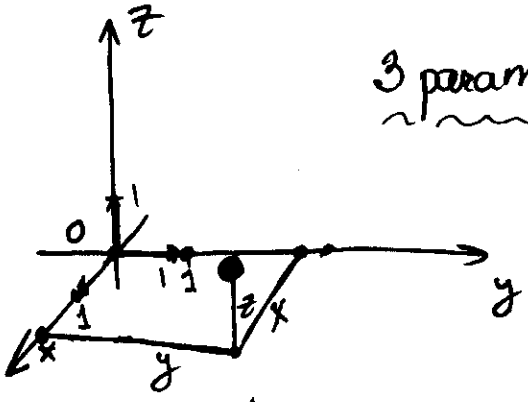
One parameter is enough to position the particles mutually

1 parameter = 1-D



Two axis => Two parameters are needed to **position the particles**

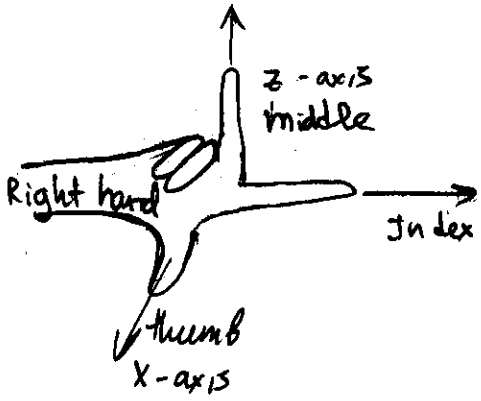
2 parameters = 2-D



3 parameters to describe position => 3-D

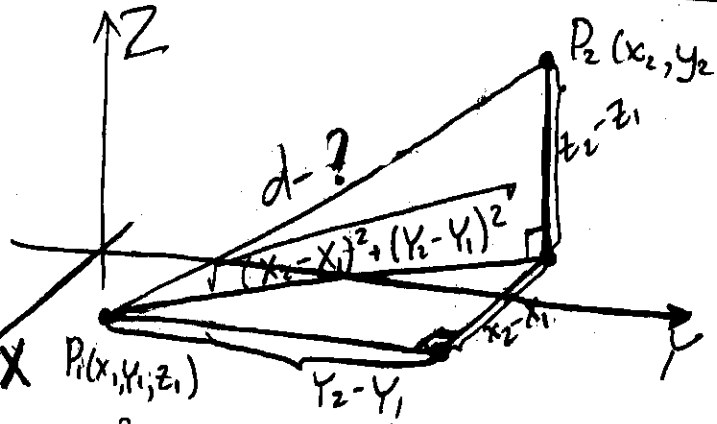
Cartesian coordinates:

1) **3** mutually perpendicular lines
2) the same unit lenght for all three
3) Positively oriented (Right-handed system)



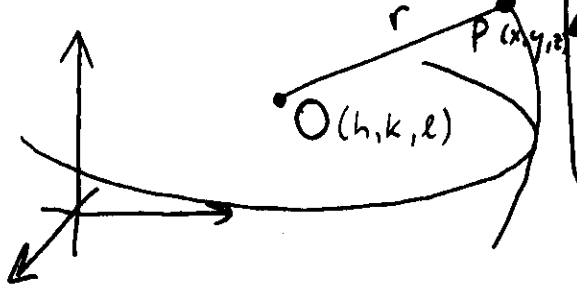
ADVANtages of CARtesian Coordinates

1) Distance Formula



$$d^2 = (X_2-X_1)^2 + (Y_2-Y_1)^2 + (Z_2-Z_1)^2$$

2) Equation of the sphere



$$r = d(O,P) = \sqrt{(x-h)^2+(y-k)^2+(z-l)^2}$$

or

$$r^2 = (x-h)^2+(y-k)^2+(z-l)^2$$

Equation of a sphere in the STANDARD Form