# STEPS TO MAP VECTORS AROUND SPHERE

### To get the LOCATION of the vectors

1. First you need the distance between vectors at the highest latitude. This is decided before you start.
2. Radius of the top intersecting circle is
3. The diameter of the sphere is then in resolution units.
4. The ceiling of this diameter tells you the resolution cube.
5. Assume that the box has corners from (-1,-1,-1) to (1,1,1). This means that the radius of this sphere is 1. Scale up if necessary.
6. The step, due to resolution, is .
7. To **map** a point to the sphere,
8. These give you the decimal coordinates. To grab the index, take each value, and do . The closest integer to this will give you the index in the box format.
9. And that’s it! These steps will place the vectors in the right position on the sphere. Next up is to get the orientation correctly.

### To get the ORIENTATION of the vectors

1. The vectors are given in . These code the strength as well as direction. However, to rotate the vector in 3d space you need to rotate your 2d vector 90 degrees clockwise to get the positive x direction coming at you. This is done by:
2. Then append a 0 at the bottom because it is flat on the xy plane. Now, given a , to rotate to the proper orientation such that it is tangent to the sphere, do the following operation:
3. The end result should be a vector that is tangent to the sphere at the location calculated in the previous set of steps.