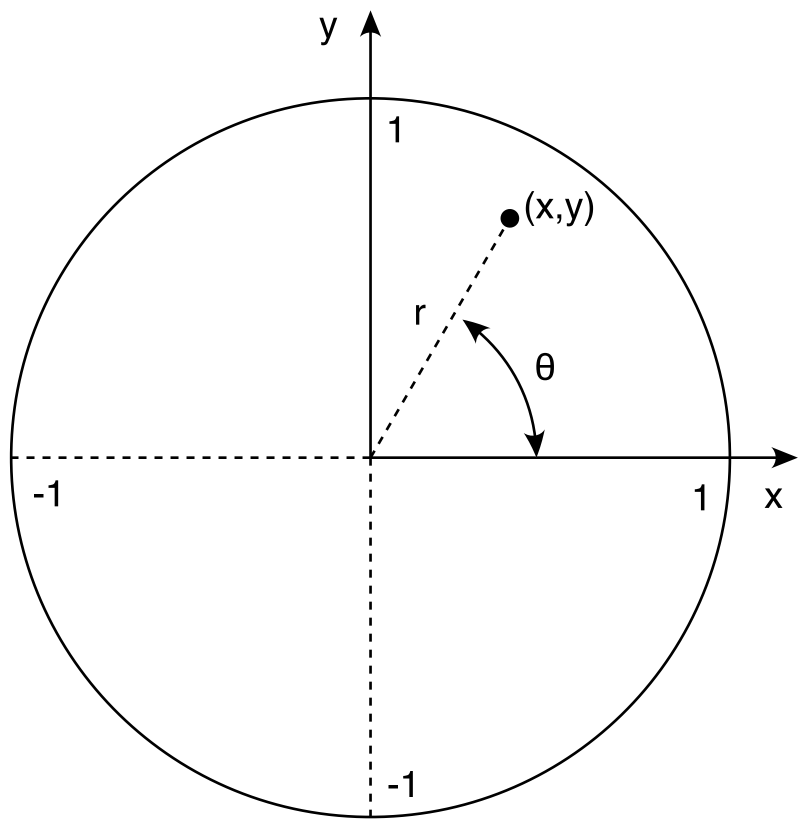


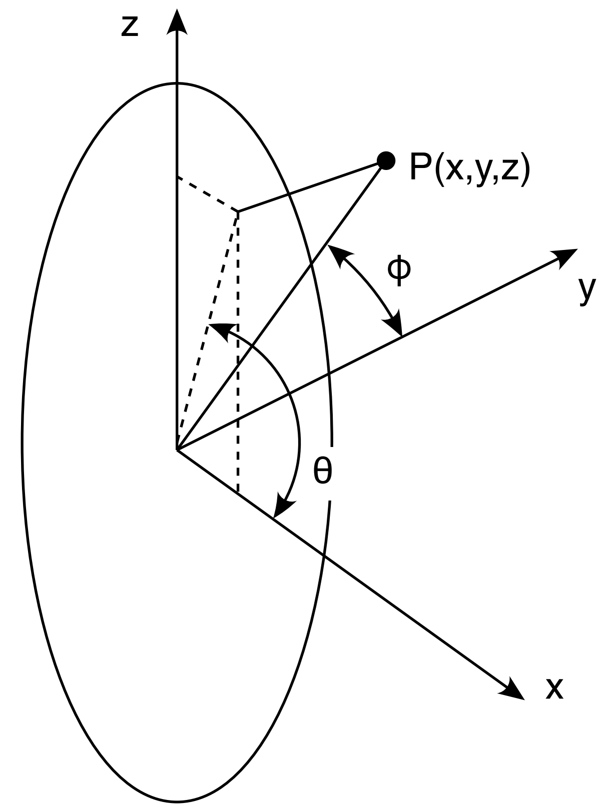
Normalised fisheye coordinates

$r = 2\ \mathrm{atan2}(\sqrt{(P_x^2+P_z^2)}, P_y)\ /\ \mathrm{aperture}$
$\theta = \mathrm{atan2}(P_z, P_x)$
$x = r\cos(\theta)$
$y = r\sin(\theta)$

3D vector to 2D fisheye

2D fisheye to 3D vector

$\phi = r\ \mathrm{aperture}\ /\ 2$
$\theta = \mathrm{atan2}(y,x)$



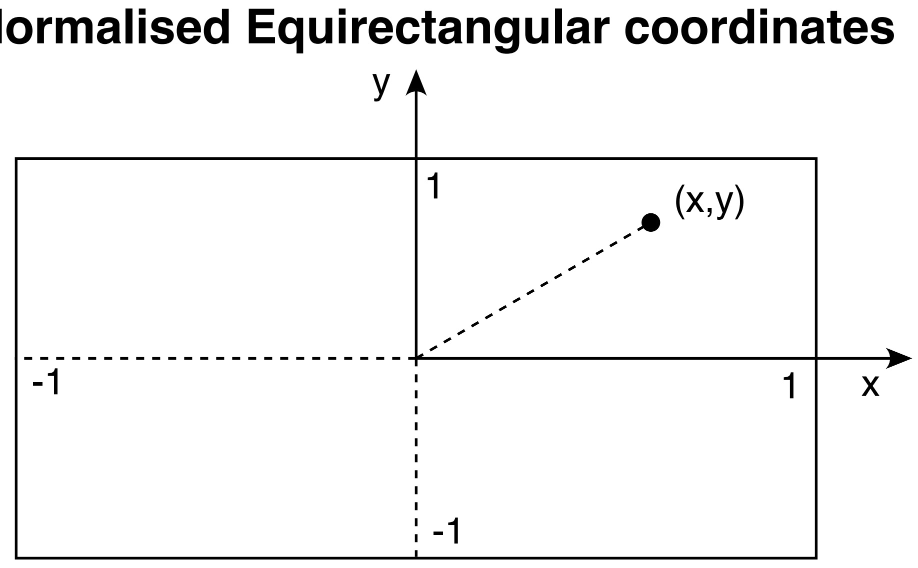
3D vector to longitude/latitude

$\mathrm{longitude} = \mathrm{atan2}(P_y, P_x)$
$\mathrm{latitude} = \mathrm{atan2}(P_z, \sqrt{(P_x^2+P_y^2)})$

longitude/latitude to 3D vector

$P_x = \cos(\mathrm{latitude})\cos(\mathrm{longitude})$
$P_y = \cos(\mathrm{latitude})\sin(\mathrm{longitude})$
$P_z = \sin(\mathrm{latitude})$

Normalised Equirectangular coordinates



$x = \mathrm{longitude}\ /\ \pi$
$y = 2\ \mathrm{latitude}\ /\ \pi$

3D vector to 2D equirectangular

2D equirectangular to 3D vector

$\mathrm{longitude} = x\ \pi$
$\mathrm{latitude} = y\ \pi\ /\ 2$
$P_x = \cos(\mathrm{latitude})\cos(\mathrm{longitude})$
$P_y = \cos(\mathrm{latitude})\sin(\mathrm{longitude})$
$P_z = \sin(\mathrm{latitude})$