Spherical Coordinates

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The Cartesian system uses x, y, z, and is most commonly used.
We use spherical variables r, θ, ϕ in the Spherical system.
Converting from Cartesian to Spherical requires use of these equations.

Cartesian to Spherical

$$x = r\cos(\theta)\sin(\phi)$$
$$y = r\sin(\theta)\sin(\phi)$$
$$z = r\cos(\phi)$$

Conversely, to go from Spherical to Cartesian, use these equations.

Spherical to Cartesian

$$r = \sqrt{x^2 + y^2 + z^2}$$
$$\theta = \arctan\left(\frac{y}{x}\right)$$
$$\phi = \arccos\left(\frac{z}{\sqrt{x^2 + y^2 + z^2}}\right)$$

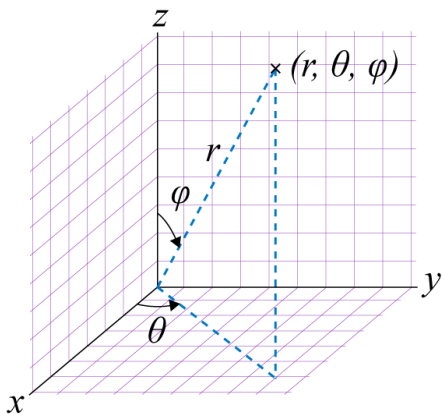

Figure 1: https://byjus.com/maths/spherical-coordinates/