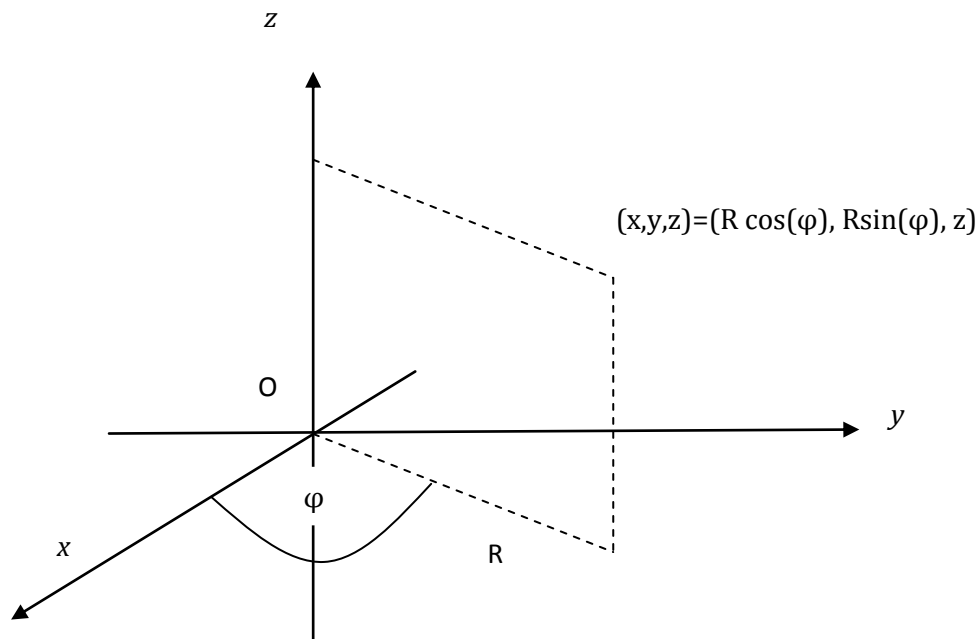


Cylindrical Polar Coordinates

Cylindrical polar coordinates or spherical polar coordinates are often more natural to use in describing three-dimensional systems than the more usual Cartesian coordinate system¹. In the cylindrical polar coordinate system, the xy plane is defined in exactly the same way as it is in the two-dimensional polar coordinate system², whereas the z coordinate remains as it is in the Cartesian coordinate system.

The following diagram illustrates the relationship between a point defined in Cartesian coordinates with its representation in cylindrical polar coordinates. (x,y,z) are the Cartesian coordinates of a point and (R, φ, z) are the cylindrical polar coordinates of the same point. The angle φ is also known as the azimuthal coordinate and it is normally restricted to $[-\pi, \pi]$ or $[0, 2\pi)$.



The formulas can be rearranged so that $R = \sqrt{x^2 + y^2}$ and $\tan(\varphi) = y/x$. See the document on the polar coordinate system² for further explanation.

¹ [Cartesian Coordinates](#)

² [Polar Coordinate System](#)