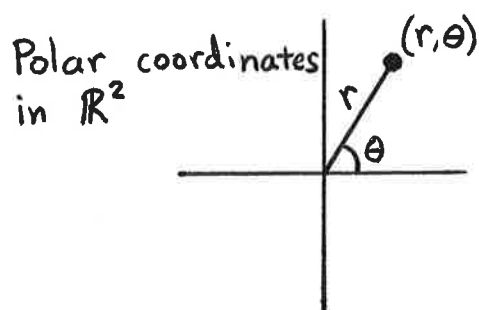
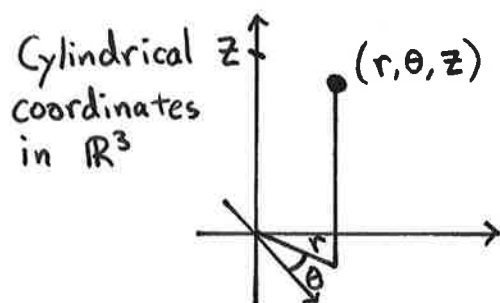


§ 8



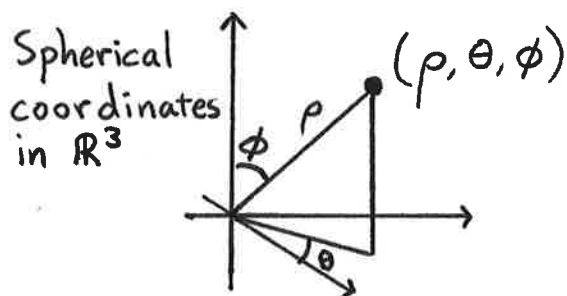
If (x, y) in Cartesian coordinates is the same point as (r, θ) in polar coordinates, then

$$\begin{aligned}x &= r \cos \theta & r &= \sqrt{x^2 + y^2} \\y &= r \sin \theta\end{aligned}$$



If (x, y, z) in Cartesian coordinates is the same point as (r, θ, z) in cylindrical coordinates, then

$$\begin{aligned}x &= r \cos \theta & r &= \sqrt{x^2 + y^2} \\y &= r \sin \theta \\z &= z\end{aligned}$$



If (x, y, z) in Cartesian coordinates is the same point as (ρ, θ, ϕ) in spherical coordinates, then

$$\begin{aligned}x &= \rho \sin \phi \cos \theta & \rho &= \sqrt{x^2 + y^2 + z^2} \\y &= \rho \sin \phi \sin \theta \\z &= \rho \cos \phi\end{aligned}$$