TSphinx Documentation

Release 1

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CHAPTER

ONE

POLAR AND SPHERICAL COORDINATES

Polar coordinates (radial, azimuth) (r, ϕ) are defined by

to

$$x = r\cos\phi$$

$$y = r\sin\phi$$

$$= r\cos\phi = r\sin\phi$$

Spherical coordinates (radial, zenith, azimuth) (rho, θ, ϕ):

$$to$$

$$x = \rho \sin\theta \cos\phi$$
$$y = \rho \sin\theta \sin\phi$$
$$z = \rho \cos\theta$$

$$= \rho \sin\theta \cos\phi \\ \rho \sin\theta \sin\phi \\ \rho \cos\theta$$

CHAPTER

TWO

ARGUMENT FUNCTION, ATAN2

Argument function $\arg(z)$ is any φ such that

$$z = re^{i\varphi}$$

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$$-\pi < \sin z \leq \pi$$

then $\arg z = \sin z + 2\pi n$, where $n = 0, \pm 1, \pm 2, \ldots$. We can then use the following formula to easily calculate $\sin z$ for any $z = x + iy$ (except $x = y = 0$, i.e. $z = 0$):

$$\sin(x + iy) = \begin{cases} \pi & y = 0; x < 0; \\ 2 \tan \frac{y}{\sqrt{x^2+y^2}+x} & \text{otherwise} \end{cases}$$

Finally we define $(\tan(y, x)$ as

CHAPTER

THREE

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