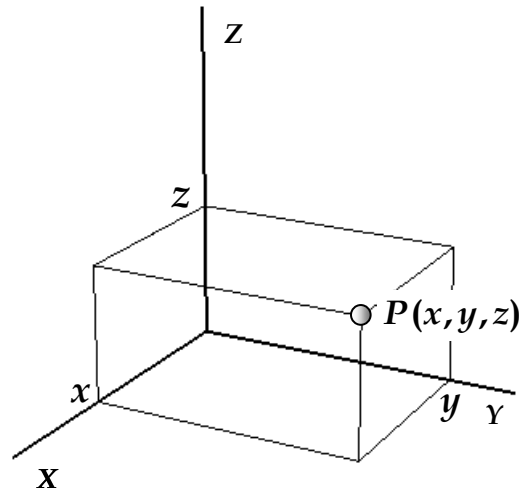


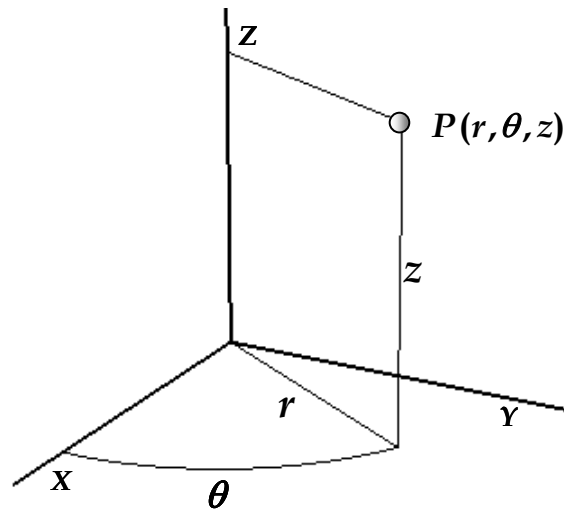
Sistemas de Coordenadas (R^3)

Coordenadas Retangulares (Cartesianas)



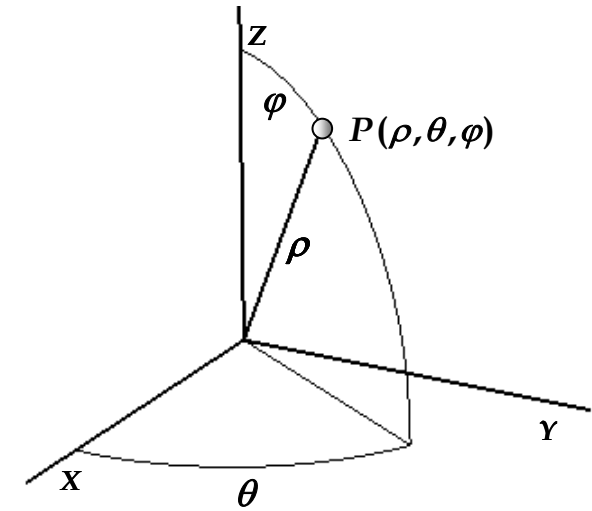
Domínio:
 $-\infty < x < \infty$
 $-\infty < y < \infty$
 $-\infty < z < \infty$

Coordenadas Cilíndricas



Domínio:
 $r \geq 0$
 $0 \leq \theta < 2\pi$
 $-\infty < z < \infty$

Coordenadas Esféricas



Domínio:
 $\rho \geq 0$
 $0 \leq \theta < 2\pi$
 $0 \leq \phi \leq \pi$

Relações Importantes:

$$dV_{ret} = dx dy dz$$

$$dV_{cil} = r dr d\theta dz$$

$$dV_{esf} = \rho^2 \sin\phi d\rho d\theta d\phi$$

ret. ---- cil.

$$x^2 + y^2 = r^2$$

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$\tan \theta = \frac{y}{x}$$

ret. ---- esf.

$$x^2 + y^2 + z^2 = \rho^2$$

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

$$y = \rho \sin \phi \sin \theta$$

$$z = \rho \cos \phi$$

$$\tan \theta = \frac{y}{x}$$

cil. ---- esf.

$$r^2 + z^2 = \rho^2$$

$$r = \rho \sin \phi$$

$$z = \rho \cos \phi$$

$$\tan \phi = \frac{r}{z}$$