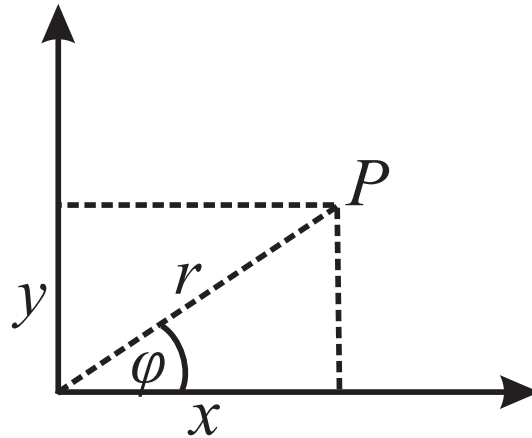


Koordinatensysteme

Polarkoordinaten



$$r = \sqrt{x^2 + y^2}$$

$$\varphi = \arctan \frac{y}{x}$$

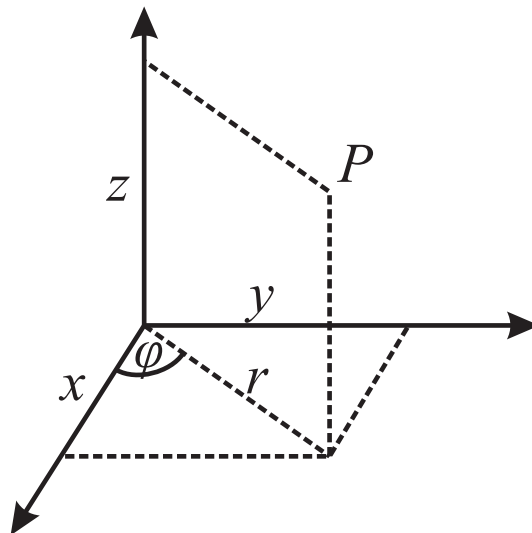
$$x = r \cos \varphi$$

$$y = r \sin \varphi$$

$$r \geq 0$$

$$0 \leq \varphi < 2\pi$$

Zylinderkoordinaten



$$r = \sqrt{x^2 + y^2}$$

$$\varphi = \arctan \frac{y}{x}$$

$$z = z$$

$$x = r \cos \varphi$$

$$y = r \sin \varphi$$

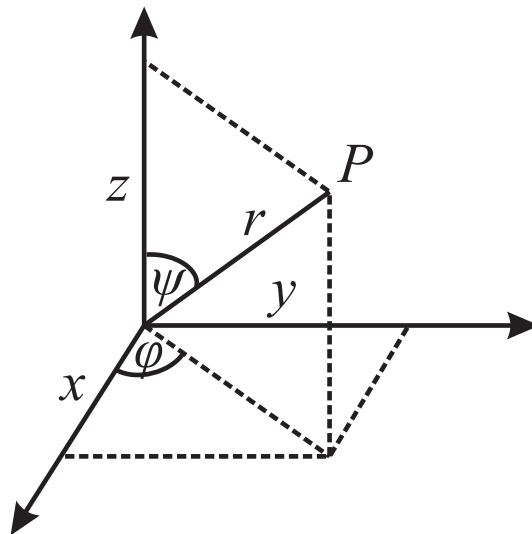
$$z = z$$

$$r \geq 0$$

$$0 \leq \varphi < 2\pi$$

$$z \in \mathbb{R}$$

Kugelkoordinaten



$$r = \sqrt{x^2 + y^2 + z^2}$$

$$\varphi = \arctan \frac{y}{x}$$

$$\psi = \arccos \frac{z}{\sqrt{x^2 + y^2 + z^2}}$$

$$x = r \cos \varphi \sin \psi$$

$$y = r \sin \varphi \sin \psi$$

$$z = r \cos \psi$$

$$r \geq 0$$

$$0 \leq \varphi < 2\pi$$

$$0 \leq \psi \leq \pi$$