

# 7. 回転系の物理

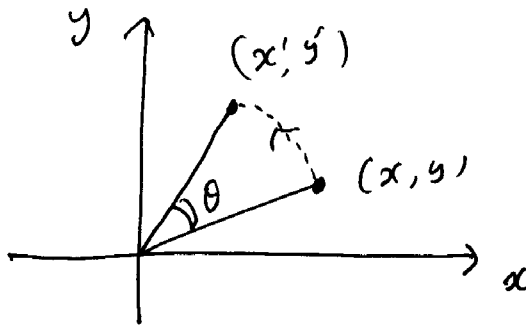
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## 7-1 座標の回転

z-軸の回転を考へる



$$\begin{cases} x = r \cos \theta_1 \\ y = r \sin \theta_1 \end{cases} \quad \begin{cases} x' = r \cos \theta_2 \\ y' = r \sin \theta_2 \end{cases}$$

$$\theta \equiv \theta_2 - \theta_1$$

zの時:

$$\begin{cases} x' = r \cos \theta_2 = r (\cos \theta \cos \theta_1 - \sin \theta \sin \theta_1) \\ y' = r \sin \theta_2 = r (\sin \theta \cos \theta_1 + \cos \theta \sin \theta_1) \end{cases}$$

$$\text{zのとき} \quad x' = \cos \theta x - \sin \theta y$$

$$y' = \sin \theta x + \cos \theta y$$

$$\therefore \begin{pmatrix} x' \\ y' \\ z' \end{pmatrix} = \begin{pmatrix} \cos \theta & -\sin \theta & 0 \\ \sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}$$