

Übungen in AlgGeo ◇ Exercices en AlgGéo ◇ T. F1 ◇ II / 9

Probl. 1 $g: \vec{v}(t) = \vec{r}_0 + t \cdot \vec{a}, \quad \vec{r}_0 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \quad \vec{a} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$

$$\overrightarrow{0P_1} = \begin{pmatrix} 7 \\ 7 \\ 10 \end{pmatrix}, \quad \overrightarrow{0P_2} = \begin{pmatrix} 4 \\ -3 \\ 9 \end{pmatrix} \rightsquigarrow \overline{P_1P_2}$$

Drehung von $\overline{P_1P_2}$ um g um par $\varphi \rightsquigarrow \overline{P'_1P'_2}$.

• Révolution de $\overline{P_1P_2}$ autour de g par $\varphi \rightsquigarrow \overline{P'_1P'_2}$.

(a) $\varphi = \varphi_1 = \frac{\pi}{7} \rightsquigarrow \overline{P'_1P'_2} = ?$

(b) $\varphi = \varphi_2 = -\frac{\pi}{7} \rightsquigarrow \overline{P'_1P'_2} = ?$

Probl. 2 Sei $D_{\alpha,q}$ = Rotation um die q -Achse um den Winkel α .

• Soit $D_{\alpha,q}$ = une rotation par l'angle α autour de l'axe q .

$$\vec{v}_0 = \begin{pmatrix} 1 \\ -2 \\ 4 \end{pmatrix}$$

Abbildungen: • Applications:

$$\begin{array}{ccccccc} \vec{v}_0 & \xrightarrow{D_{\frac{\pi}{5},z}} & \vec{v}_1 & \xrightarrow{y \mapsto -2y} & \vec{v}_2 & \xrightarrow{D_{-\frac{\pi}{5},z}} & \vec{v}_3 & \xrightarrow{D_{\frac{\pi}{6},y}} & \vec{v}_4 = M \cdot \vec{v}_0 \\ & \rightsquigarrow & \vec{v}_0 & \xrightarrow{M} & \vec{v}_4 & & & & \end{array}$$

(a) $M = ?$

(b) $\vec{v}_4 = ?$

Probl. 3 $M = \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}, \quad g: \vec{r} = \vec{r}_0 + t \cdot \vec{a} = \begin{pmatrix} -2 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} 5 \\ 7 \end{pmatrix}$

(a) $g': M \cdot \vec{r} = \vec{r}' = ?$

(b) $M \cdot \vec{x} = \vec{x} \Rightarrow \vec{x} = ?$