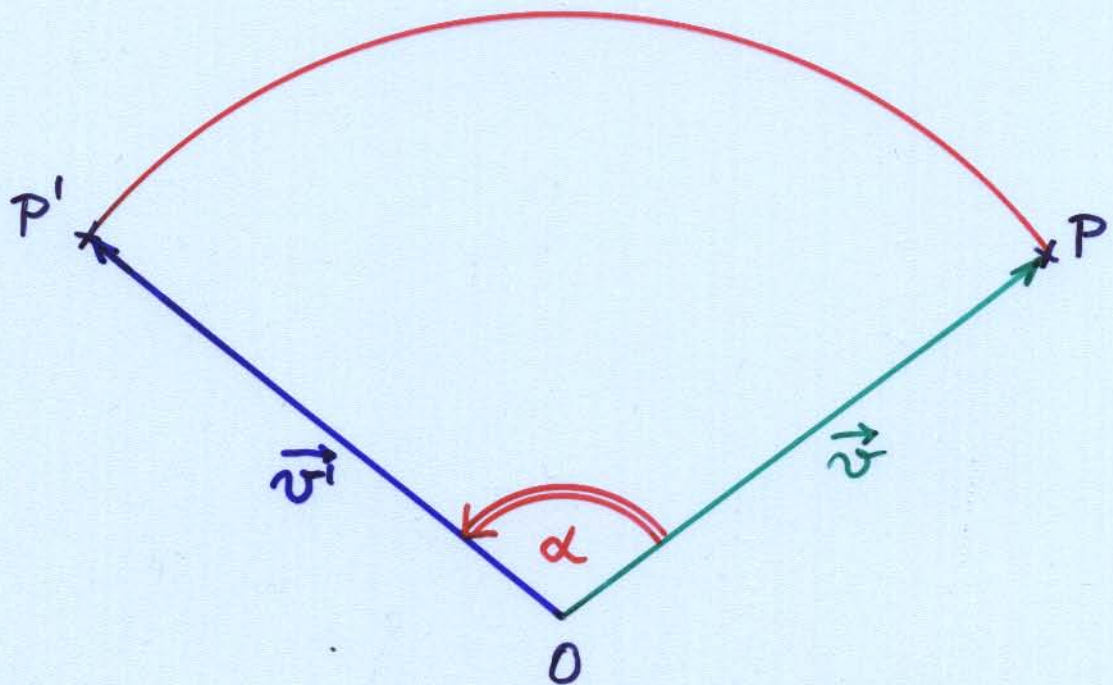


Drehung  $d: E \rightarrow E$  der Ebene

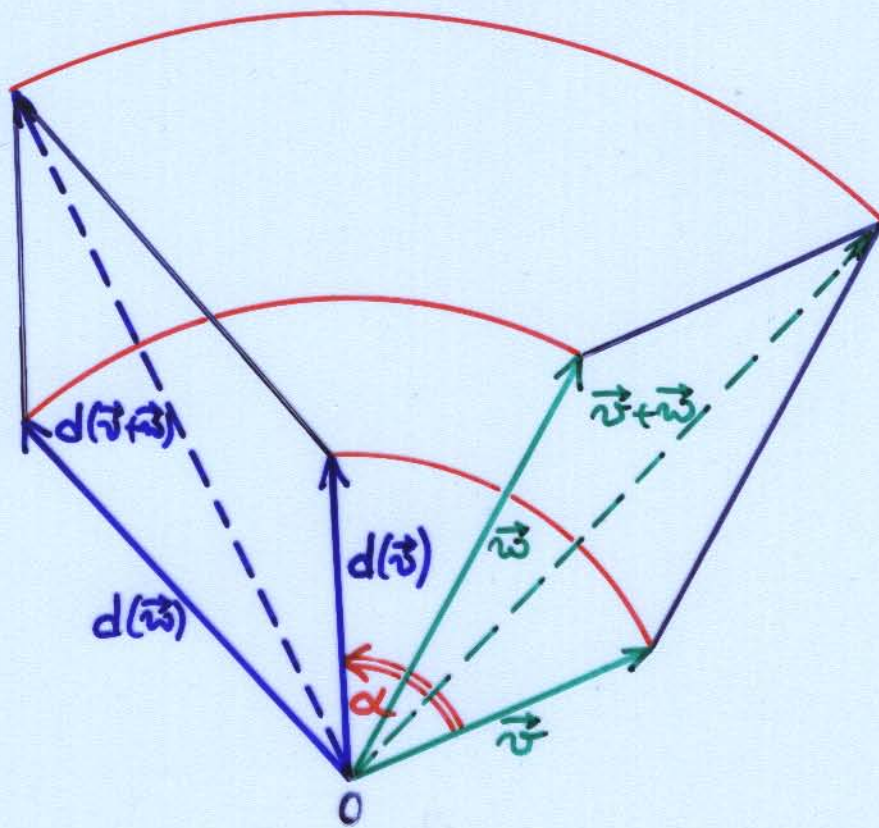
Drehpunkt:  $O$

Drehwinkel:  $\alpha$

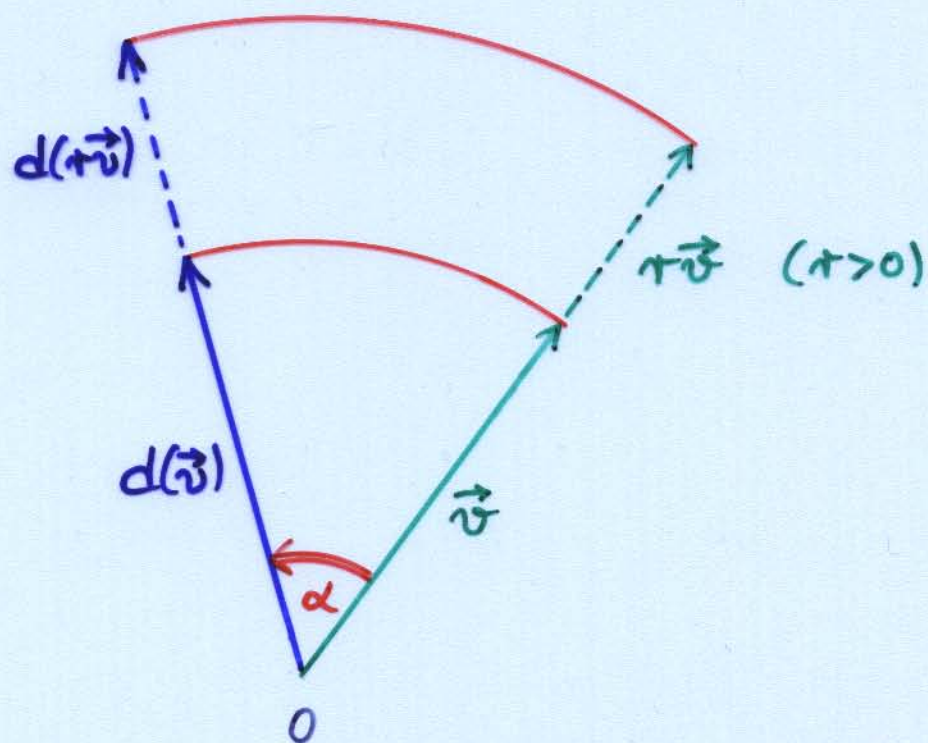
$$d(P) = P' \iff \begin{cases} \text{i)} & \|\vec{OP}\| = \|\vec{OP'}\| \\ \text{ii)} & \angle(\vec{OP}, \vec{OP'}) = \alpha \end{cases}$$



Eine Drehung  $d: E \rightarrow E$  um den Nullpunkt ist  $\mathbb{R}$ -Linear

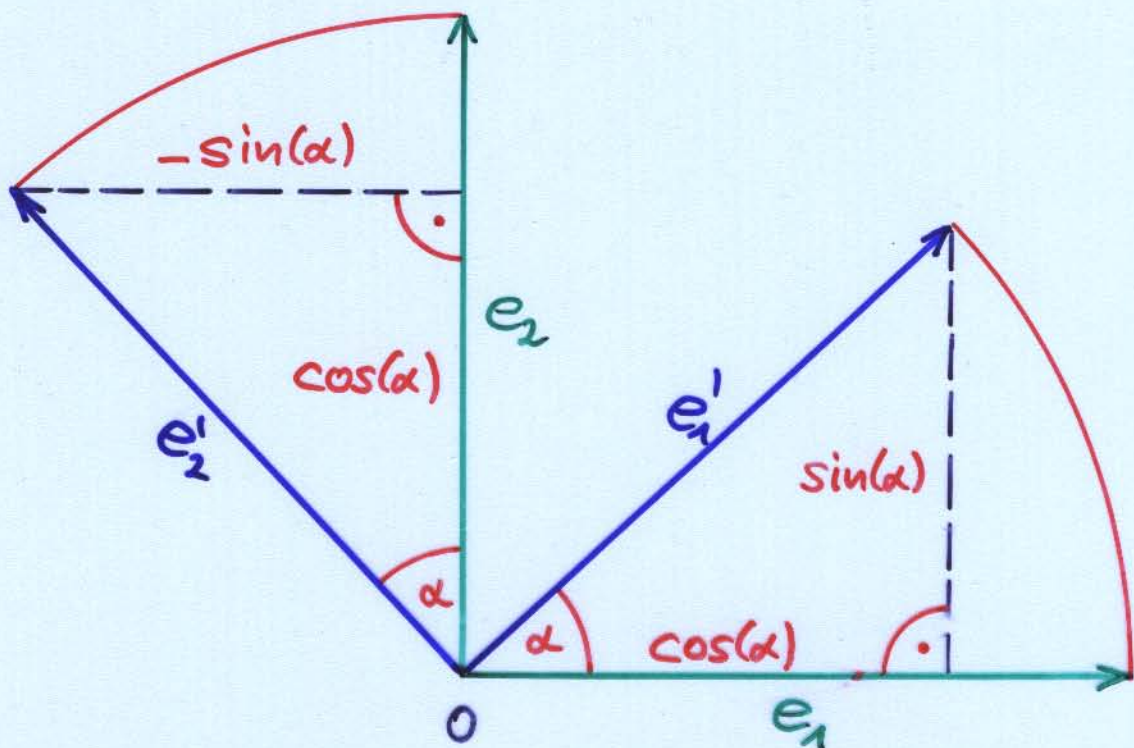


$$\underline{d(\vec{v} + \vec{w}) = d(\vec{v}) + d(\vec{w})}$$



$$\underline{\underline{d(r\vec{v}) = r d(\vec{v})}}$$

Die Darstellungsmatrix einer  
Drehung  $d: E \rightarrow E$  um  $O$  mit  
Drehwinkel  $\alpha$



$$d(e_1) = e_1' = \begin{pmatrix} \cos(\alpha) \\ \sin(\alpha) \end{pmatrix} \quad d(e_2) = e_2' = \begin{pmatrix} -\sin(\alpha) \\ \cos(\alpha) \end{pmatrix}$$

$$M(d) = \begin{pmatrix} \cos(\alpha) & -\sin(\alpha) \\ \sin(\alpha) & \cos(\alpha) \end{pmatrix} =: D_\alpha \in M_2(\mathbb{R})$$