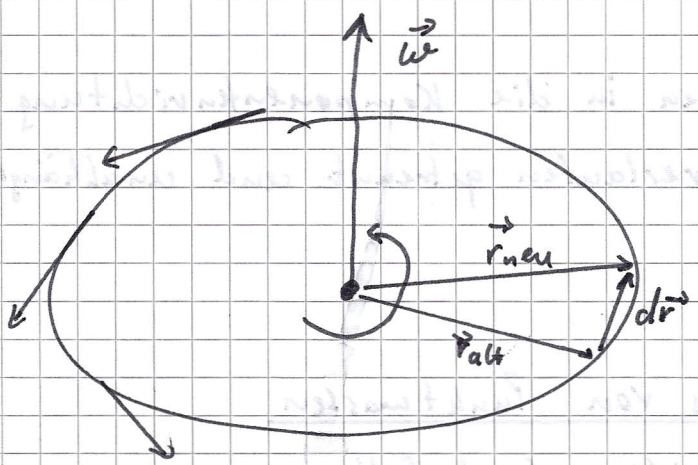
Die bei der Drehbewegung auftretenden Beschleunigungen

$$\vec{a} = \frac{d\vec{v}}{dt} \quad \text{mit} \quad \vec{v} = \vec{\omega} \times \vec{r} \rightarrow \vec{a} = \frac{d\vec{\omega}}{dt} \times \vec{r} + \vec{\omega} \times \frac{d\vec{r}}{dt}$$

$\frac{d\vec{r}}{dt} = \vec{v} = \vec{\omega} \times \vec{r}$



$$\vec{v} = \vec{\omega} \times \vec{r}$$

$$\vec{a} = \frac{d}{dt}\left(\vec{\omega} \times \vec{r}\right) = \vec{\alpha} \times \vec{r} - \omega^2 \vec{r}$$

$$a = \dot{v}$$
$$\uparrow$$
$$v = \omega \times r$$

$$a = \frac{d}{dt}\left(\omega \times r\right)$$

$$\boxed{a = \omega' \times r + \omega \times r'}$$

$$a = \frac{d}{dt}\left(\omega \times r\right) = \vec{\alpha} \times \vec{r} - \omega^2 \vec{r}$$

$\vec{\alpha} \times \vec{r}$ → Winkelbeschleunigung

$-\omega^2 \vec{r}$ → Zentripetalbeschleunigung

$$a = \vec{\alpha} \times \vec{r}$$