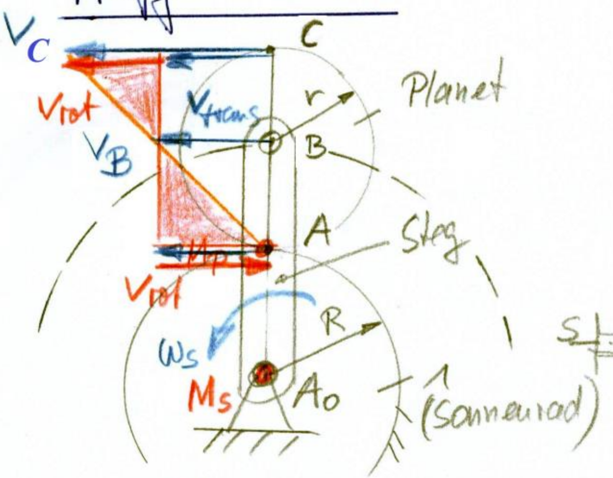
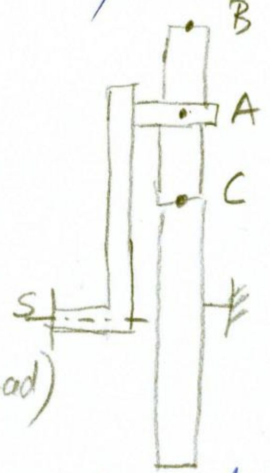
Musterlösung

Aufgabe 2-4



a) Geschwindigkeiten v_A, v_B, v_C



$$v_A = 0$$
$$v_B = \omega_S \cdot (R+r)$$
$$v_C = 2\, v_B$$
$$v_C = 2 \cdot \omega_S (R+r)$$

b) Beschleunigungen a_A und a_C des Planeten

Aufteilung in Translation : $v_B = v_{trans}$

\+ gleichzeitig Rotation : $v_{rot} = v_B$

Punkt **C** : $\vec{a}_C = \vec{a}_{n,trans} + \vec{a}_{t,trans} + \vec{a}_{n,rot} + \vec{a}_{t,rot}$

Reine Translation bedeutet, dass der Planet ohne Rotation um Rad 1 bewegt wird, auf einer Kreisbahn.

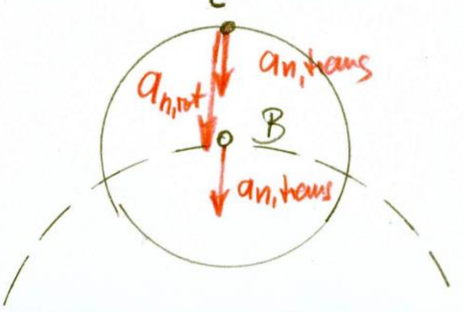
$$a_{n,trans} = \frac{v_{trans}^2}{r_{trans}} = \frac{v_B^2}{R+r}$$

$$a_{t,trans} = 0, \text{ da } \omega_s = \omega_{trans} = \text{konst}$$

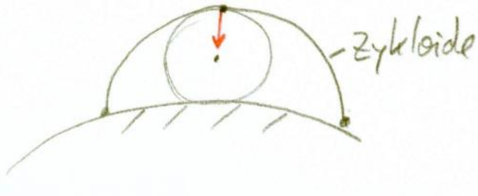
Reine Rotation bedeutet, dass der Planet quasi um das nun feste Lager **B** dreht.

$$a_{n,rot} = \frac{v_{rot}^2}{r_{rot}} = \frac{v_B^2}{r}$$

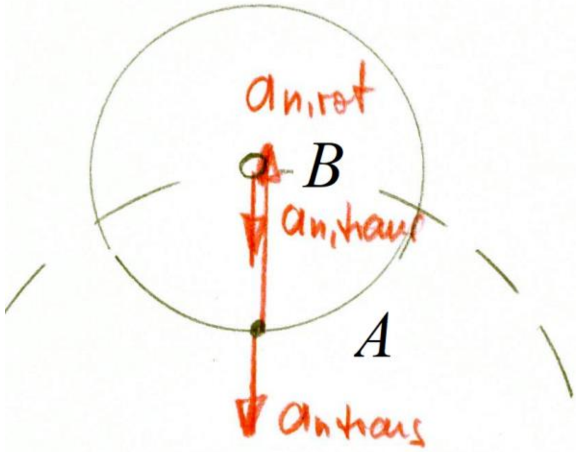
$$a_{t,rot} = 0, \text{ da } \omega_{rot} = \frac{v_{rot}}{r} = \text{konst.}$$



$$|\vec{a}_C| = \frac{v_B^2}{R+r} + \frac{v_B^2}{r}$$



Punkt A



$$a_{n,trans} = \frac{v_B^2}{R+r}$$

$$a_{n,rot} = \frac{v_B^2}{r}$$

$$|a_A| = a_{n,trans} - a_{n,rot}$$