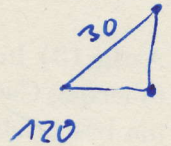


Aufg. 1 Robotik Klausur SS 2008, Lösung

$$\varphi_y = -90^\circ$$



1. Move PTP, v_{max} , VP1, z25

2. Move Lin, v_{10} , P1, $\varphi_y = -90^\circ$, z1
2a. Tool on

3. Move Lin, v_{10} , P2, $\varphi_y = -90^\circ$, z1

4. Move Zirk, v_{10} , P3, $\varphi_y = 0^\circ$, z1, ZP = $(120 + \sqrt{1^2 \cdot 30^2}$

4a Tool off

$$ZP = (131.21, 31.21) \cdot 10 + \sqrt{\frac{1}{2} \cdot 30}$$

5. Move ~~PL~~ Lin, v_{10} , VP2, z25

6. Move PTP, v_{max} , ~~Home~~ ZP2, z50

7. Move PTP, v_{max} , Home

Fehler: je (5) Abzug

	Punkte		φ_y
	x	y	
VP1	30	50	-90
P1	20	40	-90
P2	170	40	-90
P3	140	10	0
VP2	160	10	0

Aufg. 2

$$H_{TK} = \text{Transl.}(10, -30, 20), \text{Rot}(\text{z} \times, -90^\circ)$$

a)

$$= \begin{pmatrix} 1 & 0 & 0 & 10 \\ 0 & \cos(-90^\circ) & -\sin(-90^\circ) & -30 \\ 0 & \sin(-90^\circ) & \cos(-90^\circ) & 20 \\ 0 & 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 10 \\ 0 & 0 & +1 & -30 \\ 0 & -1 & 0 & 20 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

b)

$$\begin{pmatrix} 1 & 0 & 0 & 10 \\ 0 & 0 & 1 & -30 \\ 0 & -1 & 0 & 20 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} -10 \\ 12 \\ 10 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ -20 \\ 8 \\ 1 \end{pmatrix}$$

(bis hier: 25)

Robotik Klausur 2008, Lösung

Aufg 2 (cont.)

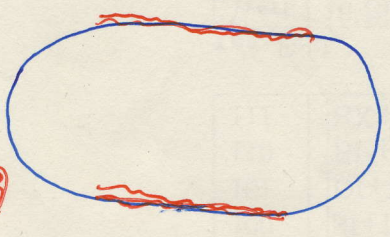
$$c) \quad K T_H = \left({}_H T_K \right)^{-1} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 20 \\ 0 & 1 & 0 & 30 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & -10 \\ 0 & 0 & -1 & 20 \\ 0 & 1 & 0 & 30 \\ 0 & 0 & 0 & 1 \end{pmatrix} \stackrel{H}{=} \begin{pmatrix} 1 & 0 & 0 & -4 \\ 0 & 0 & -1 & 25 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

Aufg. 3

a) 2 (2)

flacher Arbeitsraum



b) 90° (5)

0, z_m, 0 (5)
~~0, R₁ + 0~~ (5)

Aufg. 4

Wenn $\theta = 0^\circ$ oder $\theta = 180^\circ$, z_m beliebig (5) - 10