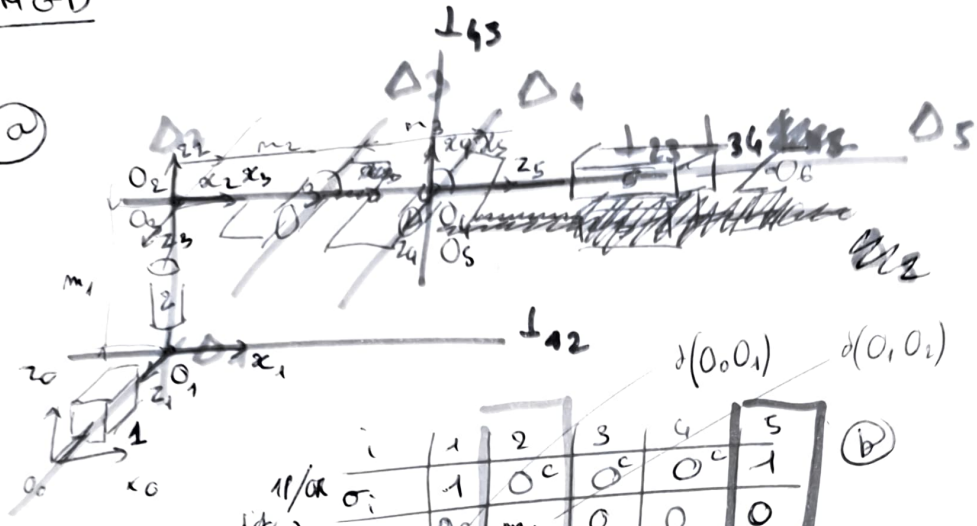
Examen de Robotique Avril 2022

① MGD

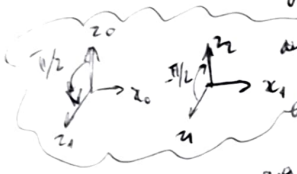
ⓐ



ⓑ

$d(O_0O_1)$ $d(O_1O_i)$

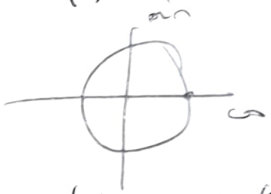
i	1	2	3	4	5
1/σ	-1	0 c	0 c	0 c	1
dist(x) a_{i-1}	0	m_1	0	0	0
ang(z) α_{i-1}	$\pi/2$	$-\pi/2$	$+\pi/2$	0	$+\pi/2$
dist(z) r_i	c 0	c 0	0	m_2	0
ang(z) θ_i	0	0	0	$+\pi/2$	0
q_i fg	0 r_i	0 θ_i	0 θ_i	$\theta_i + \pi/2$	0 r_i



$\cos(\pi) = -1$ $\sin(\pi) = 0$

$\cos(-\frac{\pi}{2}) = 0$ $\sin(-\frac{\pi}{2}) = -1$

$\cos(0) = 1$ $\sin(0) = 0$



$\cos(\frac{\pi}{2}) = 0$ $\sin(\frac{\pi}{2}) = 1$

Légende
C → constant

ⓒ

Formule généralisée

$$T_{i-1,i} = \begin{bmatrix} \cos(\theta_i) & -\sin(\theta_i) & 0 & a_{i-1} \\ \cos(\alpha_{i-1})\sin(\theta_i) & \cos(\alpha_{i-1})\cos(\theta_i) & -\sin(\alpha_{i-1}) & -r_i\sin(\alpha_{i-1}) \\ \sin(\alpha_{i-1})\sin(\theta_i) & \sin(\alpha_{i-1})\cos(\theta_i) & \cos(\alpha_{i-1}) & r_i\cos(\alpha_{i-1}) \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$T_{1,2}(q_2) =$

$$\begin{bmatrix} 1 & 0 & 0 & m_1 \\ 0 & 0 & 1 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$T_{4,5}(q_5) =$

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

ⓓ