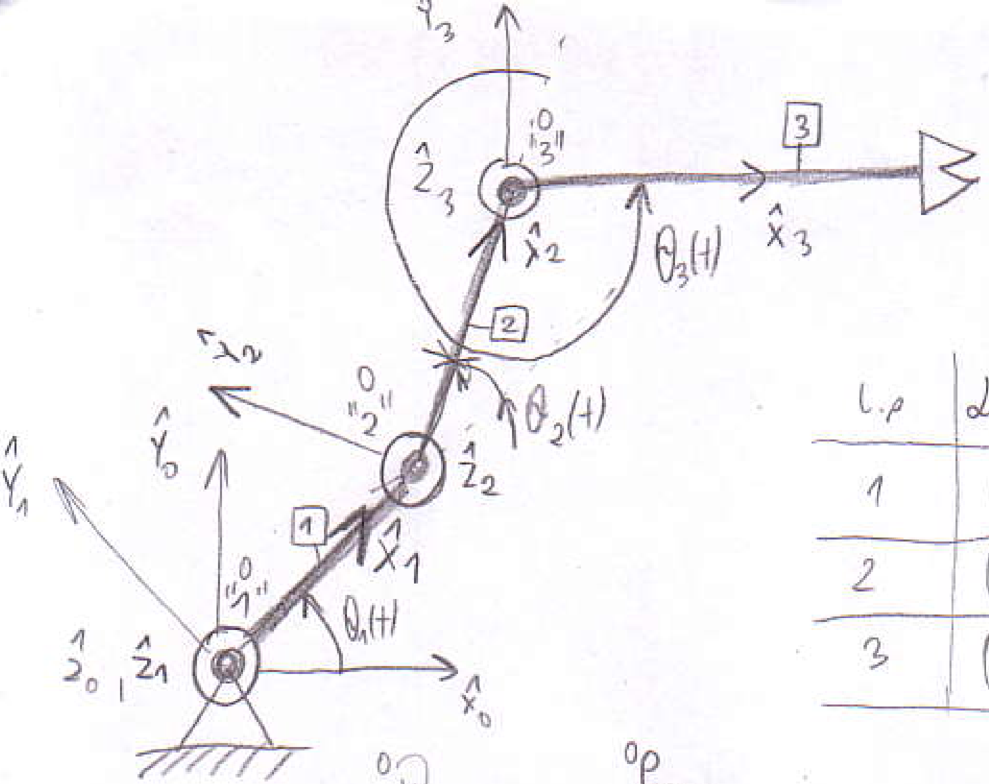

i.p	α_{i-1}	a_{i-1}	d_i	θ_i
1	0^{α_0}	0^{a_0}	0	$\theta_1(t)$
2	0^{α_1}	$l_1^{a_1}$	0	$\theta_2(t)$
3	0^{α_2}	$l_2^{a_2}$	0	$\theta_3(t)$

$$
\begin{array}{cc}
 & \begin{array}{cc} {}^0_1R & {}^0P_{1ORG} \end{array} \\
{}^0_1T = & \begin{bmatrix} c\theta_1(t) & -s\theta_1(t) & 0 & 0 \\ s\theta_1(t) & c\theta_1(t) & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}
\end{array}
$$

$$
{}^3\bar{P} = \begin{bmatrix} l_3 \\ 0 \\ 0 \end{bmatrix}
$$

General form of transformation matrix form coordinates system "i" to coordinates system "i-1"

$$
{}^{i-1}_{i}T = \begin{bmatrix} c\theta_i & -s\theta_i & 0 & a_{i-1} \\ s\theta_i \cdot c\alpha_{i-1} & c\theta_i \cdot c\alpha_{i-1} & -s\alpha_{i-1} & -s\alpha_{i-1} \cdot d_i \\ s\theta_i \cdot s\alpha_{i-1} & c\theta_i \cdot s\alpha_{i-1} & c\alpha_{i-1} & c\alpha_{i-1} \cdot d_i \\ 0 & 0 & 0 & 1 \end{bmatrix}
$$

$$
s\theta_i \rightarrow sin\theta_i \ and \ c\theta_i \rightarrow cos\theta_i
$$

$$
{}^1_2T = \begin{bmatrix} c\theta_2(t) & -s\theta_2(t) & 0 & l_1 \\ s\theta_2(t) & c\theta_2(t) & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}
$$

$$
{}^2_3T = \begin{bmatrix} c\theta_3(t) & -s\theta_3(t) & 0 & l_2 \\ s\theta_3(t) & c\theta_3(t) & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}
$$

$$
{}^0\bar{P} = {}^0_1T \cdot {}^1_2T \cdot {}^2_3T \cdot {}^3\bar{P}
$$

To calculate coordinates of vector P in system "0" we have to execute multiplying.

http://www.mbstudent.com/robotics-theory.html