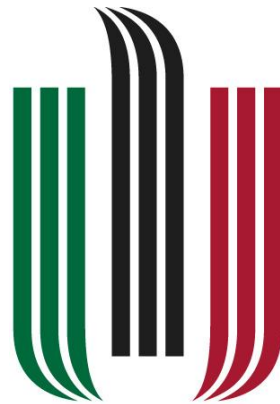


Kinematics and Dynamics of Mechatronic Systems

Laboratory no.1 (01-03)

Geometrical model of a spatial mechanism



AGH



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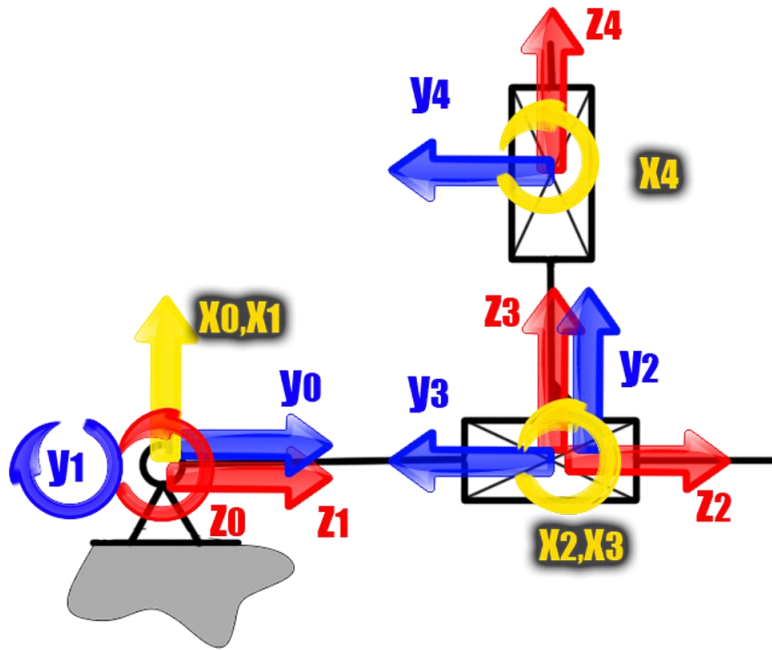
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Authors: **Jakub Słowik**

Paweł Otto Markiewicz

Mechatronics

year: I – Masters degree



	θ	d	a	α
1	θ_1	0	0	90°
2	90°	a_2	0	0
3	0	0	0	90°
4	0	d_3	0	0

For simulations we have assumed following values:

	θ_1	a_2	d_3
1	45°	4	2
2	60°	5	1.5
3	180°	2	2

```
clc;
clear all;

syms th1 a2 d3 q1

A1=mA(th1,0,0,sym(pi/2));
A2=mA(sym(pi/2),a2,0,0);
A3=mA(0,0,0,sym(pi/2));
A4=mA(0,d3,0,0);

T04=A1*A2*A3*A4;

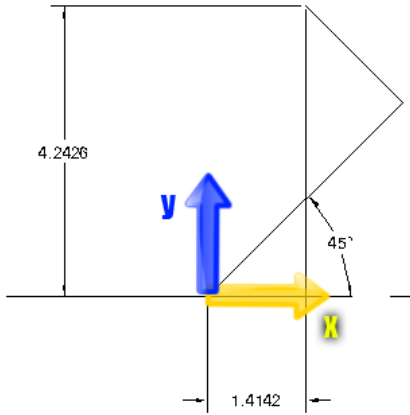
T04v=subs(T04,{th1},{q1});

zmie=[[1,0,0,0];[0,1,0,0];[0,0,0,0];[0,1,0,0]];

T04u=zam(zmie,T04v);

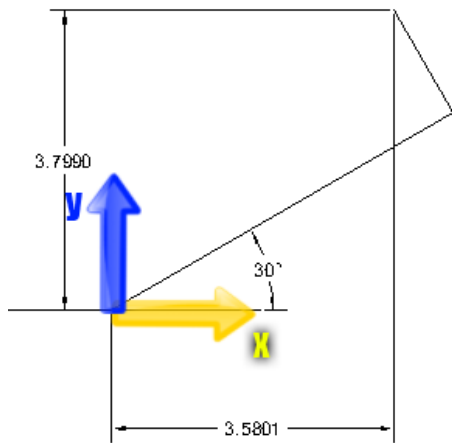
T04n=subs(T04,{th1,a2,d3},{pi/4,4,2})
T04n=subs(T04,{th1,a2,d3},{pi/6,5,1.5})
T04n=subs(T04,{th1,a2,d3},{pi,2,2})
```

Results:



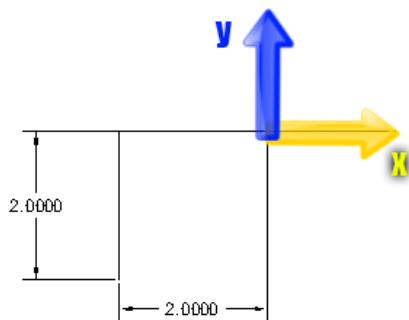
T04n =

$$\begin{bmatrix} 0 & 0.7071 & 0.7071 & 4.2426 \\ 0 & -0.7071 & 0.7071 & 1.4142 \\ 1.0000 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1.0000 \end{bmatrix}$$



T04n =

$$\begin{bmatrix} 0 & 0.5000 & 0.8660 & 3.7990 \\ 0 & -0.8660 & 0.5000 & 3.5801 \\ 1.0000 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1.0000 \end{bmatrix}$$



T04n =

$$\begin{bmatrix} 0 & 0 & -1 & -2 \\ 0 & 1 & 0 & -2 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Comparing the results from graphical method with calculations it could be sad that they correspond to each other so script works correctly and DH notation was prepared correctly.