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## Parameters

joint	$a_i$	$\alpha_i$	$d_i$	$\theta_i$
1	0	$-90^\circ$	290	$45^\circ$
2	270	0	0	<del>30</del> <sup>0</sup>
3	70	$-90^\circ$	0	$-20^\circ$

$$A_1 = \begin{bmatrix} C_{45^\circ} & 0 & -S_{45^\circ} & 0 \\ S_{45^\circ} & 0 & C_{45^\circ} & 0 \\ 0 & -1 & 0 & 290 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_2 = \begin{bmatrix} C_{30^\circ} & -S_{30^\circ} & 0 & C_{30^\circ}(270) \\ S_{30^\circ} & C_{30^\circ} & 0 & S_{30^\circ}(270) \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_3 = \begin{bmatrix} C_{-20^\circ} & 0 & -S_{-20^\circ} & C_{-20^\circ}(70) \\ S_{-20^\circ} & 0 & C_{-20^\circ} & S_{-20^\circ}(70) \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_1 = \begin{bmatrix} 0.71 & 0 & -0.71 & 0 \\ 0.71 & 0 & 0.71 & 0 \\ 0 & -1 & 0 & 290 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_2 = \begin{bmatrix} 0.87 & -0.5 & 0 & 234.9 \\ 0.5 & 0.87 & 0 & 135 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_3 = \begin{bmatrix} 0.94 & 0 & 0.34 & 65.8 \\ -0.34 & 0 & 0.94 & -23.8 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_1 * A_2 = C$$

$$C_{11} = 0.6177; C_{12} = -0.355; C_{13} = -0.71$$

$$C_{14} = 166.779.$$

$$C_{21} = 0.6177; C_{22} = -0.355; C_{23} = 0.71$$

$$C_{24} = 166.779$$

$$C_{31} = -0.5; C_{32} = -0.87; C_{33} = 0$$

$$C_{34} = 313.8$$

$$C_{41} = 0; C_{42} = 0; C_{43} = 0; C_{44} = 1$$

$$A_1 * A_2 = \begin{bmatrix} 0.6177 & -0.355 & -0.71 & 166.779 \\ 0.6177 & -0.355 & 0.71 & 166.779 \\ -0.5 & -0.87 & 0 & 313.8 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$C_{11} = 0.70 ; C_{12} = 0.71 ; C_{13} = -0.12$$

$$(A_1 * A_2) = C_{14} = 215.87.$$

$$* A_3 \quad C_{21} = 0.70 ; C_{22} = -0.71 ; C_{23} = -0.12$$

$$C_{24} = 215.87$$

$$C_{31} = -0.17 ; C_{32} = 0 ; C_{33} = -0.99$$

$$C_{34} = 301.60$$

$$C_{41} = 0 ; C_{42} = 0 ; C_{43} = 0 ; C_{44} = 1$$

$$H_2^0 = \begin{bmatrix} 0.70 & 0.71 & -0.12 & 215.87 \\ 0.70 & -0.71 & -0.12 & 215.87 \\ -0.17 & 0 & -0.99 & 301.60 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$