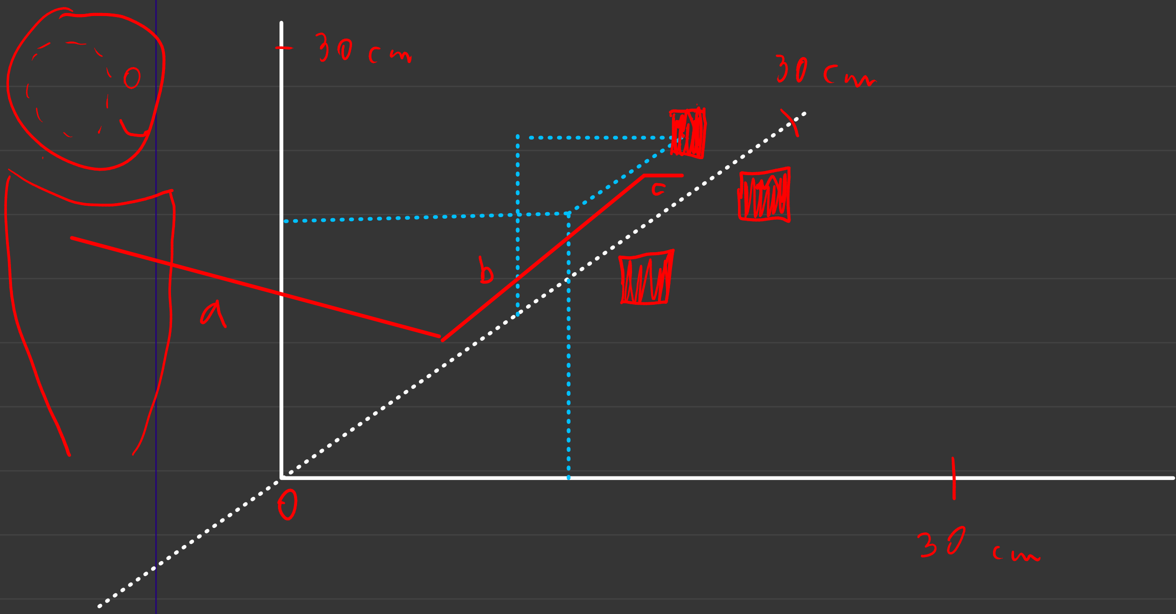
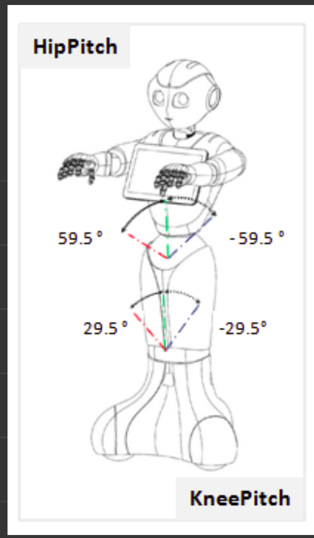
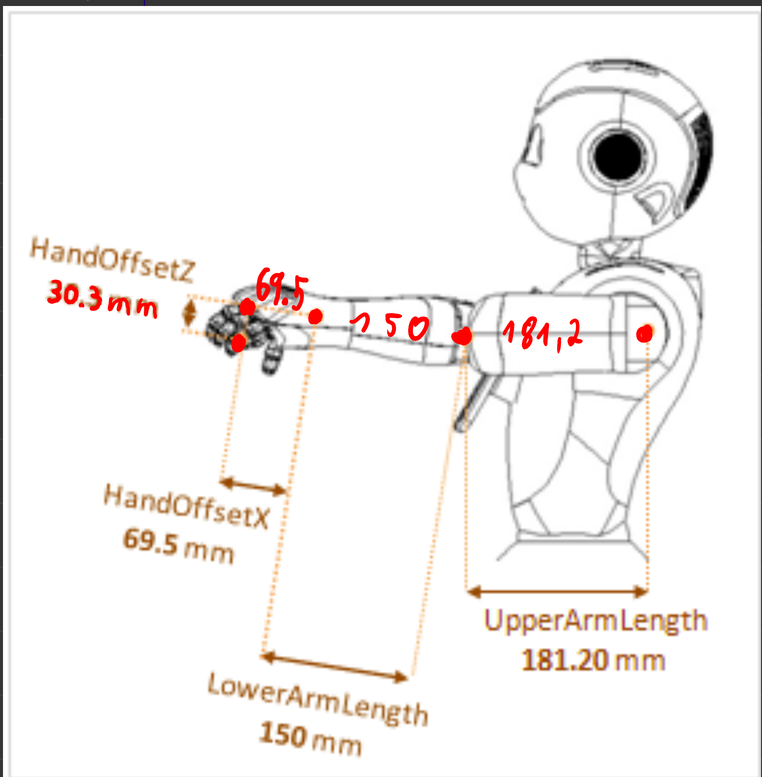
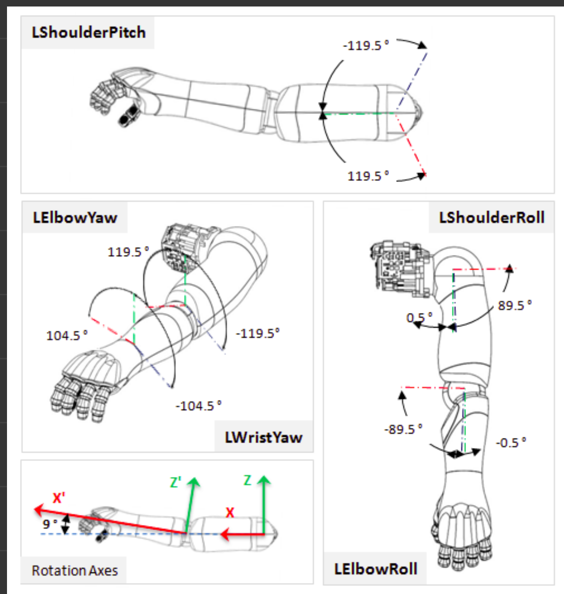
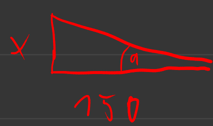


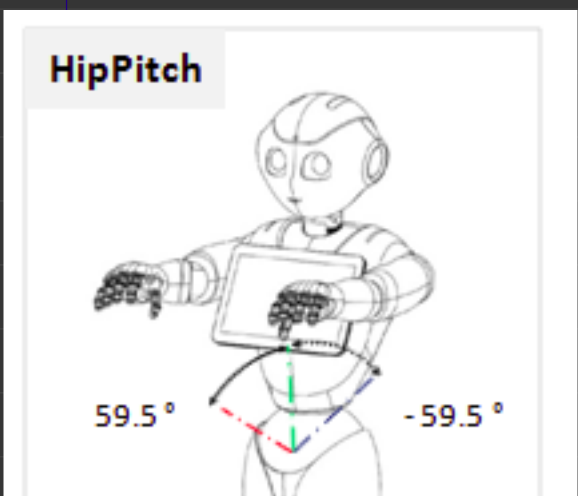


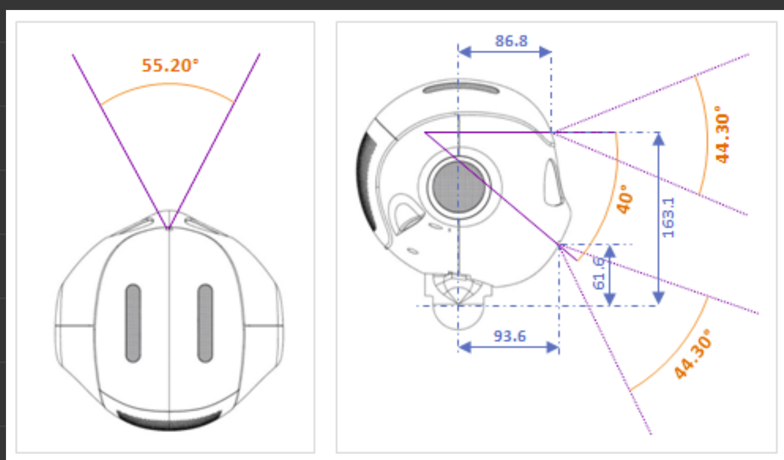


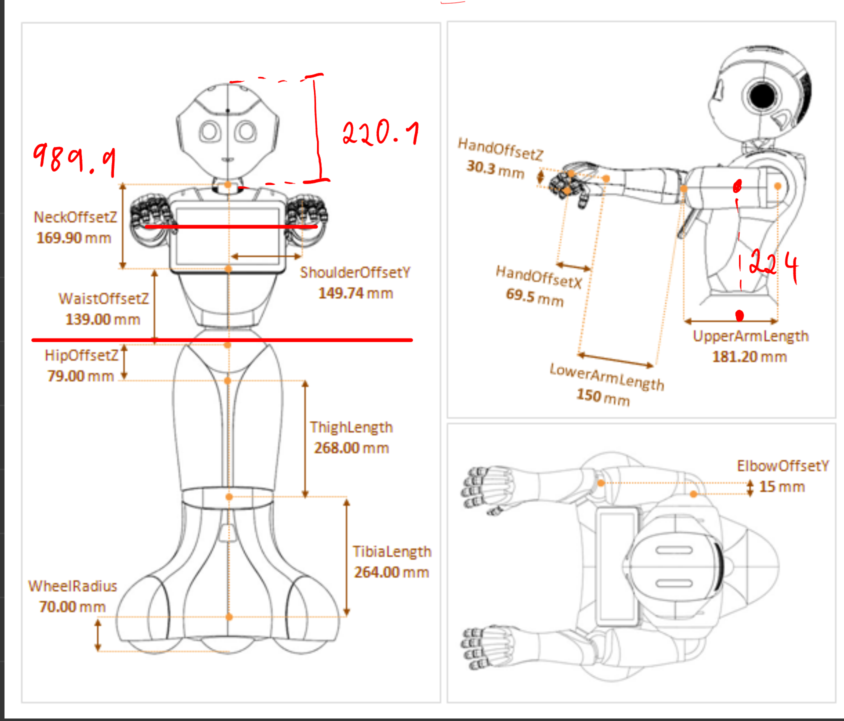


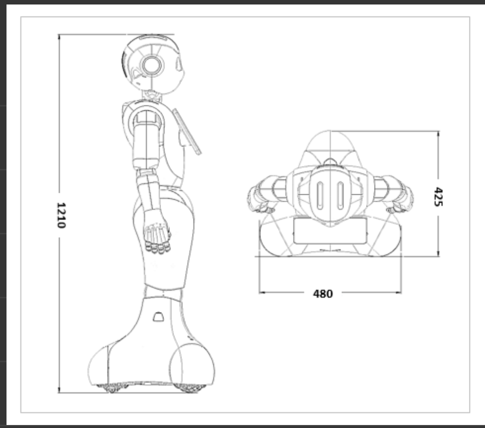


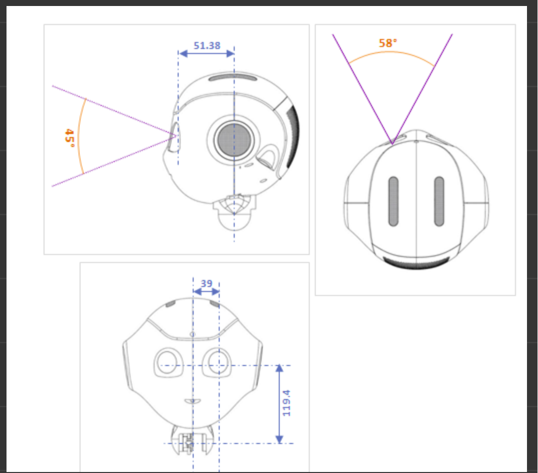
$tg\ a = \frac{x}{150}$

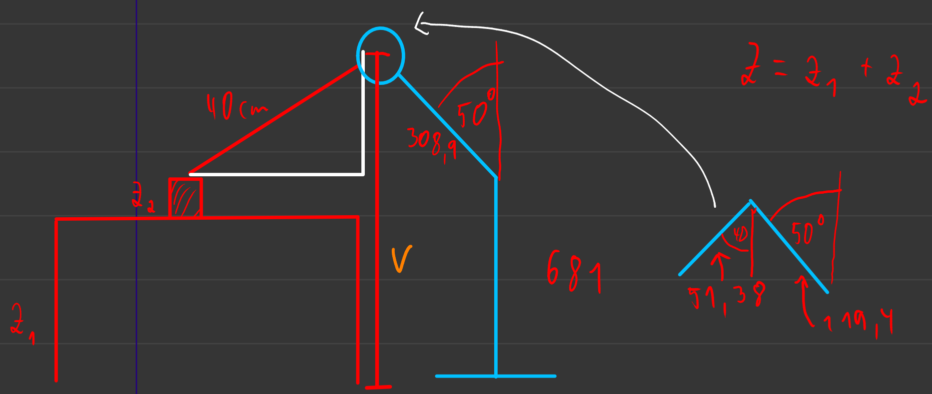






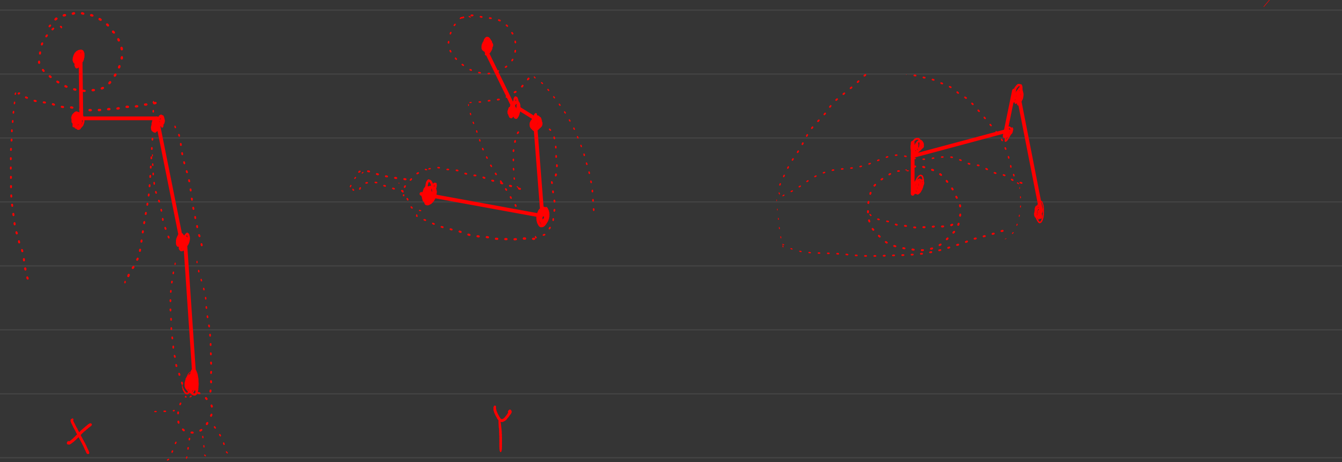


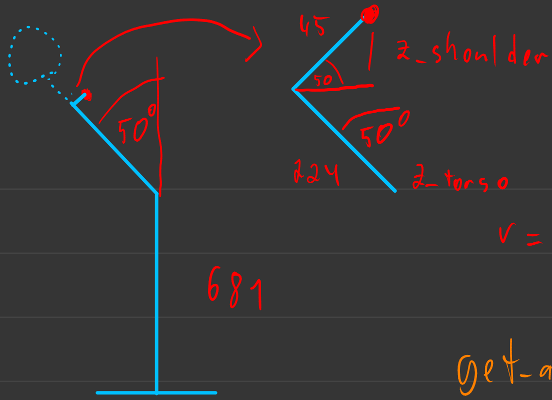




výška kamery $V = \cos x \cdot 308{,}9 + (\cos x \cdot 119{,}4 - \cos(90 - x) \cdot 51{,}38)$

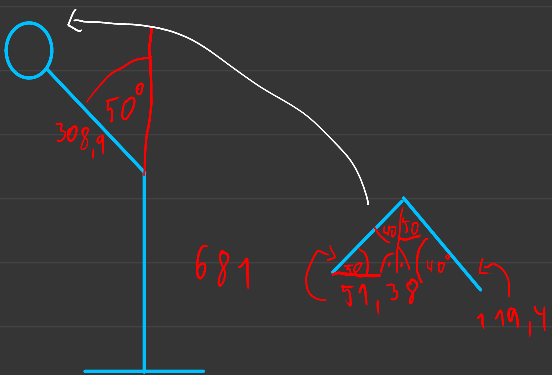
get_absolute_camera_z

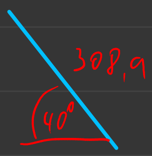




$v = 681 + \cos x \cdot 224 + \sin x \cdot 45$

get_absolute_shoulder_z

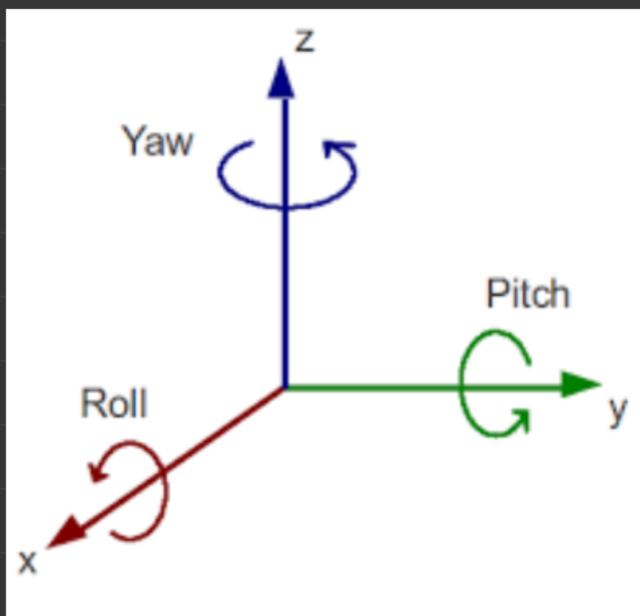




$\cos 40° = \frac{x}{308{,}9}$

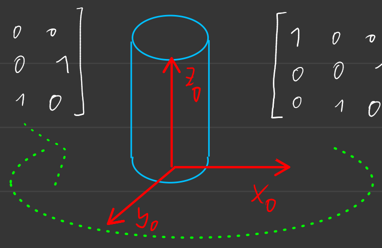
$y = 90 - x$

$x = \cos y \cdot 308{,}9 + \cos y \cdot 119{,}4$
$+ \cos x \cdot 51{,}38$

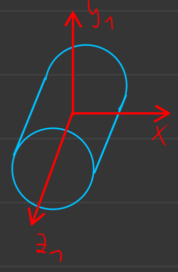


otáčí se podle z v kladném směru $x \longrightarrow y$

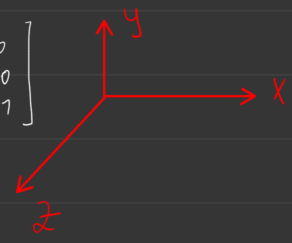
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

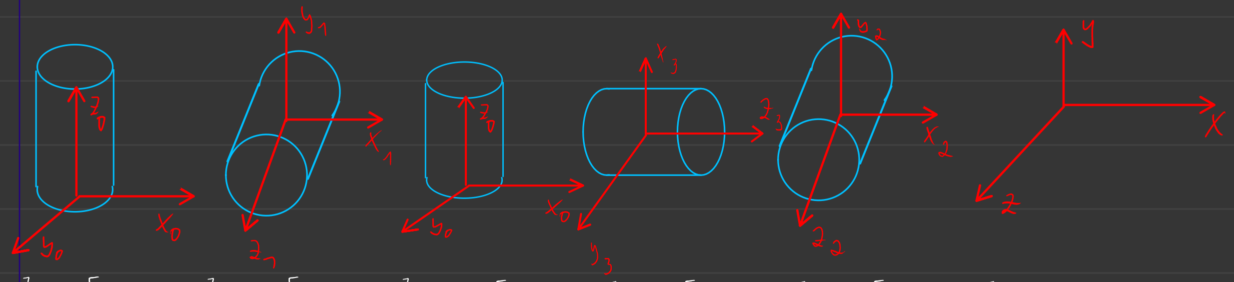


$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

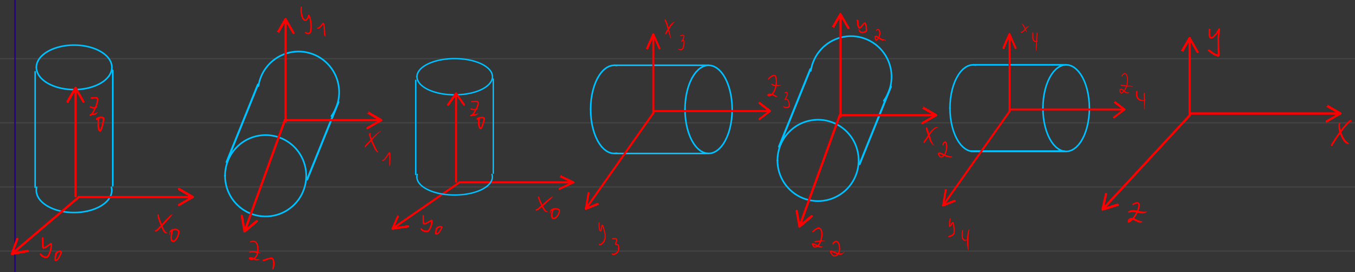


$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$





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



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

$$\begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix}\quad \begin{matrix}1&0&0\\0&0&1\\0&1&0\end{matrix}\quad \begin{matrix}0&1&0\\1&0&0\\0&0&1\end{matrix}\quad \begin{matrix}0&1&0\\0&0&1\\1&0&0\end{matrix}\quad \begin{matrix}0&0&1\\1&0&0\\0&1&0\end{matrix}\quad \begin{matrix}0&0&1\\0&1&0\end{matrix}$$

Rotation matrices

$$R(0-1) = \begin{bmatrix}\cos\alpha_0 & -\sin\alpha_0 & 0\\ \sin\alpha_0 & \cos\alpha_0 & 0\\ 0 & 0 & 1\end{bmatrix} \cdot \begin{bmatrix}1&0&0\\0&0&1\\0&1&0\end{bmatrix}$$

$$R(1-2) = \begin{bmatrix}\cos\alpha_0 & -\sin\alpha_0 & 0\\ \sin\alpha_0 & \cos\alpha_0 & 0\\ 0 & 0 & 1\end{bmatrix} \cdot \begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix}$$

$$R(0-2) = R(0-1) \cdot R(1-2)$$

$$R(2-3) = \begin{bmatrix}\cos\alpha_0 & -\sin\alpha_0 & 0\\ \sin\alpha_0 & \cos\alpha_0 & 0\\ 0 & 0 & 1\end{bmatrix} \cdot \begin{bmatrix}0&0&1\\1&0&0\\0&1&0\end{bmatrix}$$

$$R(0-3) = R(0-2) \cdot R(2-3)$$

$$R(3-4) = \begin{bmatrix}\cos\alpha_0 & -\sin\alpha_0 & 0\\ \sin\alpha_0 & \cos\alpha_0 & 0\\ 0 & 0 & 1\end{bmatrix} \cdot \begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix}$$

$$R(0-4) = R(0-3) \cdot R(3-4)$$

$$R(4-5) = \begin{bmatrix}\cos\alpha_0 & -\sin\alpha_0 & 0\\ \sin\alpha_0 & \cos\alpha_0 & 0\\ 0 & 0 & 1\end{bmatrix} \cdot \begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix}$$

$$R(0-5) = R(0-4)\ R(4-5)$$

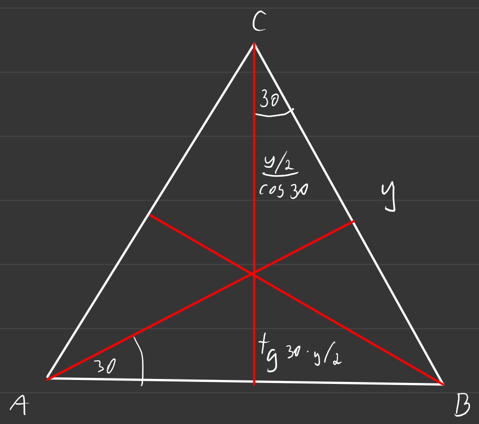
Shoulder to elbow, length = 20, placement: (20, 0, 0)
x, y, z

$$\begin{pmatrix} \cos 0 & -\sin 0 & 0 \\ \sin 0 & \cos 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix} \cdot$$

$$\begin{pmatrix} \cos 90 & -\sin 90 & 0 \\ \sin 90 & \cos 90 & 0 \\ 0 & 0 & 1 \end{pmatrix} \cdot \begin{array}{c} \begin{pmatrix} 20 \\ 0 \\ 0 \end{pmatrix} \end{array} \begin{array}{l} x \\ y \\ z \end{array}$$

$$\begin{pmatrix} 0 & -1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{pmatrix} \begin{pmatrix} 20 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 20 \end{pmatrix}$$

$$= \begin{pmatrix} 0 \\ 0 \\ 20 \end{pmatrix}$$



$A = [X - tg\,30 \cdot y/2,\ -y/2,\ z]$

$B\ [X - tg\,30 \cdot y/2,\ y/2,\ z]$

$C = [X + \frac{y/2}{\cos 30},\ 0,\ z]$

$\cos 30 = \frac{y/2}{x}$